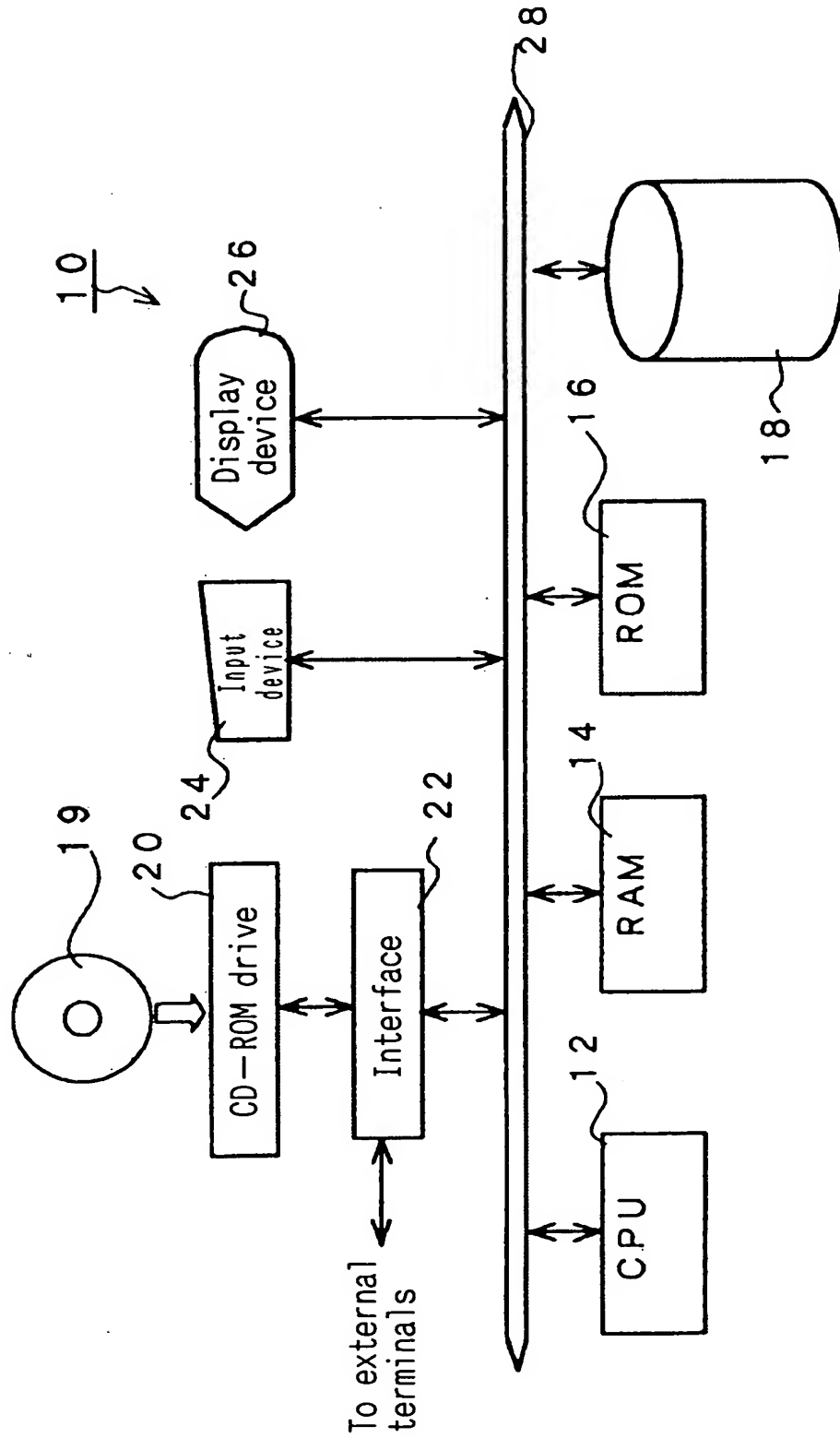
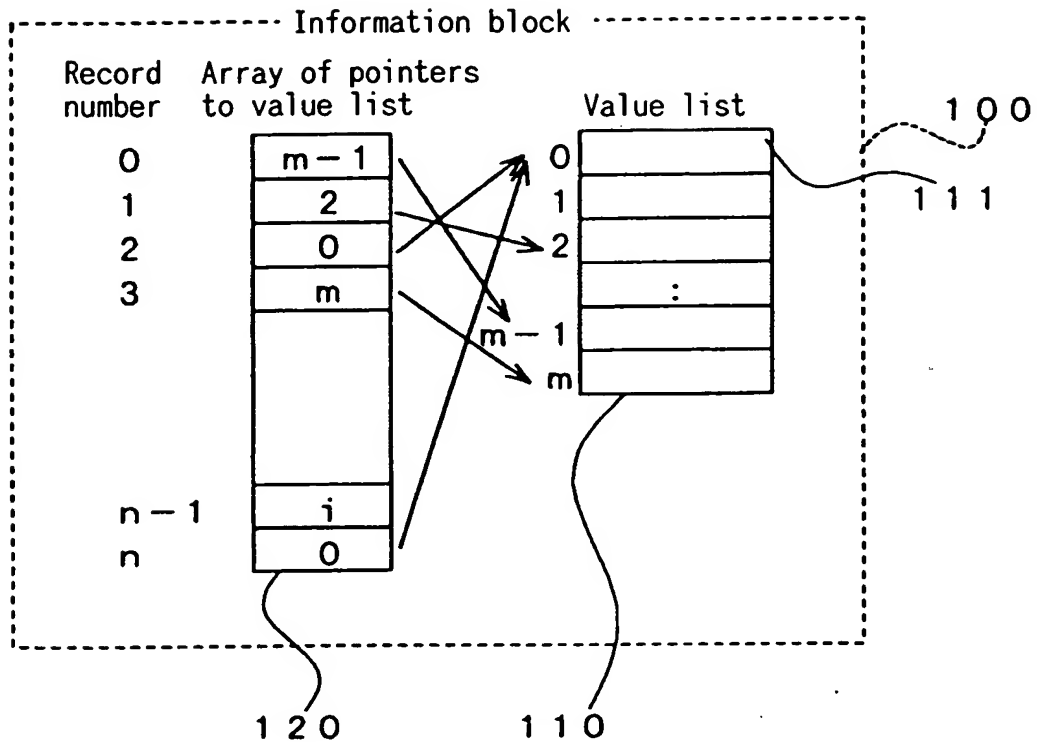


FIG. 1



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FIG. 2



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FIG. 3A

Record No.	Customer ID	Customer name	Telephone number
0	1	Smith	333-aaa
1	2	Lennon	441-bbbb
2	3	Bernstein	558-cccc
3	4	Carlson	998-dddd
4	5	Ford	112-eeee
5	6	Eagle	225-ffff

FIG. 3B

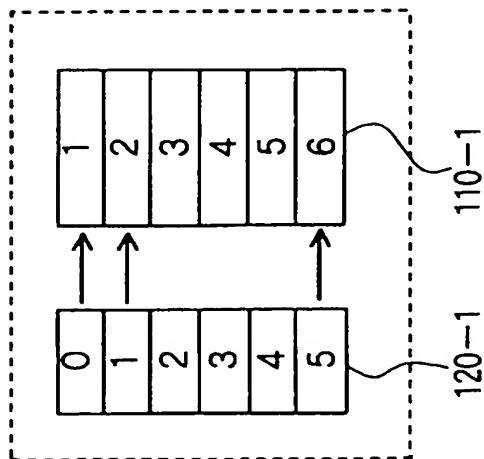


FIG. 3C

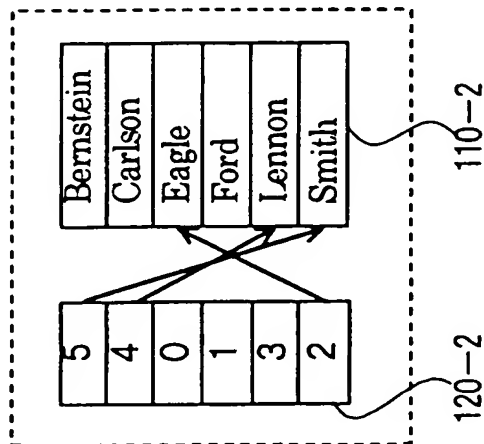
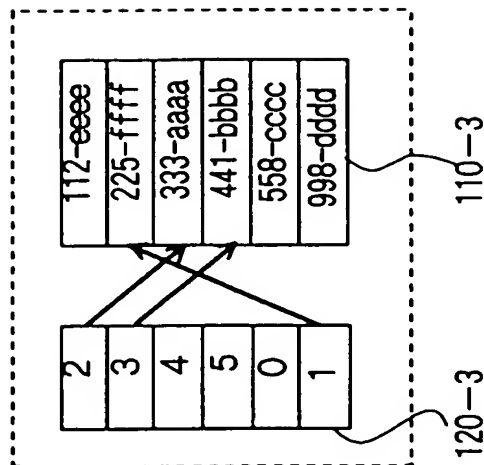


FIG. 3D



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FIG. 4A

Record No.	Sex	Age	Occupation
0	Female	1 8	Programmer
1	Male	2 1	Student
2	Female	3 1	Teacher
:	:	:	:
:	:	:	:
999999	Female	1 6	Student

FIG. 4B

		Field Category value	No.	Start position	Count		
0	1	0	Male	0	632564	0	1
1	0	1	Female	632564	367436	1	
2	1						
999999	1					999999	999999

210-1 230-1 220-1 200-1

FIG. 4C

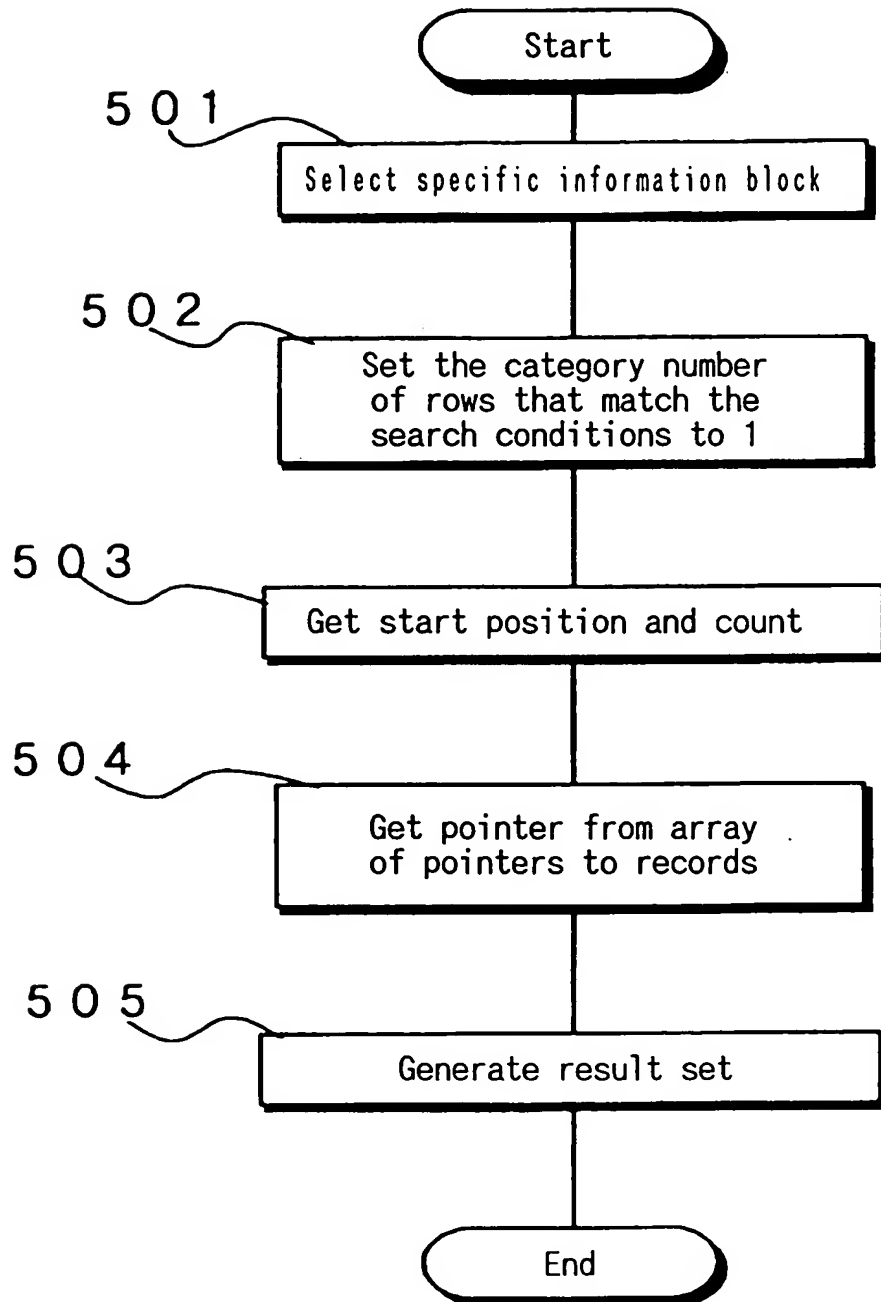
		Field Category value	No.	Start position	Count		
0	2	0	16	0	45898	0	
1	5	1	17	45898	78550	1	:
2	15	2	18	124448	113689		:
		3	19	238137	189653		:
		4	20	427790	125643	45897	999999
		5	21	553433	155535	45898	
		:	:	:	:		:
		15	31	911546	35648		:
		:	:	:	:	999999	
999999	0	65	81	999489	511		

220-2 210-2 230-2 200-2

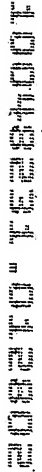
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FIG. 5



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FIG. 7A

0	Female
	1 8
	Programmer
1	Male
	2 1
	Student
2	Female
	3 1
	Teacher
999999	Female
	1 6
	Student

FIG. 7B

0	Female
1	Male
2	Female
:	:
:	:
999999	Female
0	1 8
1	2 1
2	3 1
:	:
:	:
999999	1 6
0	Programmer
1	Student
2	Teacher
:	:
:	:
999999	Student

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FIG. 8A

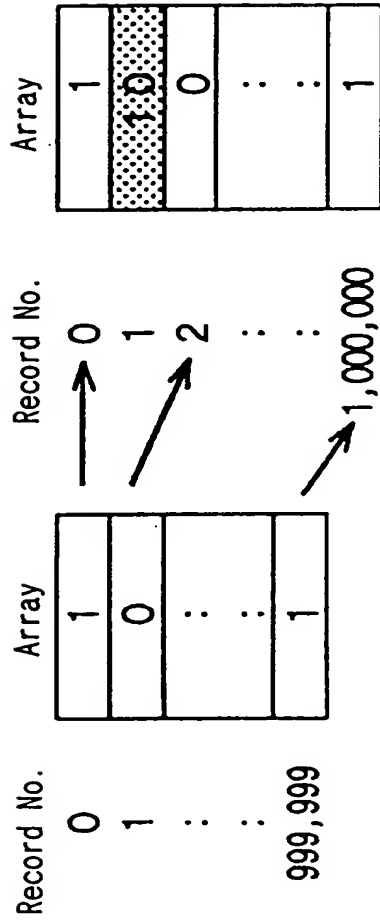
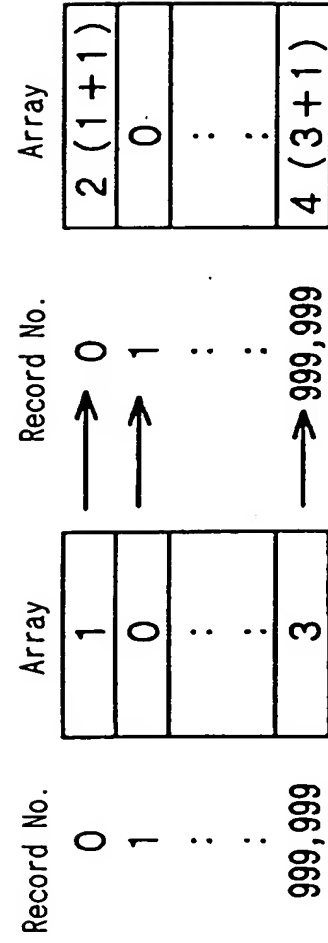


FIG. 8B



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FIG. 9A

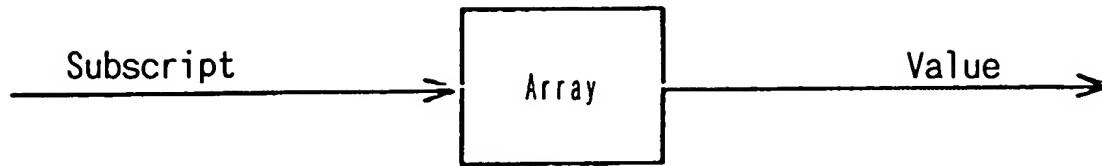
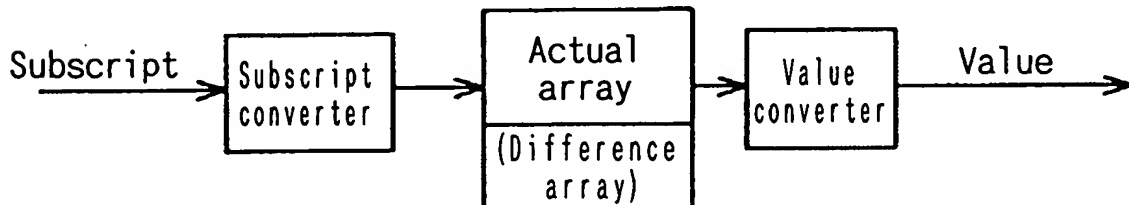
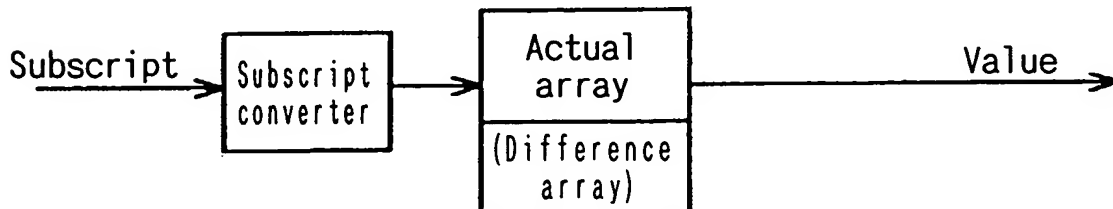


FIG. 9B



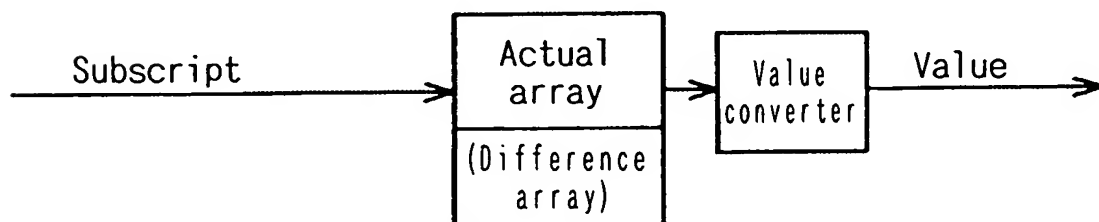
Example of converting both subscripts and values

FIG. 9C



Example of converting subscripts only

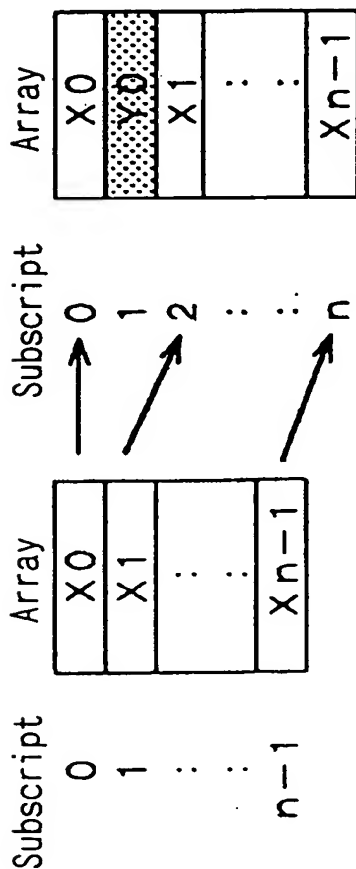
FIG. 9D



Example of converting values only

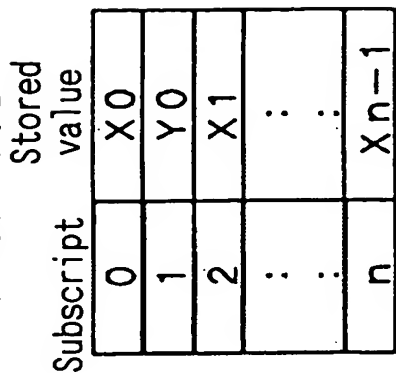
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FIG. 10A



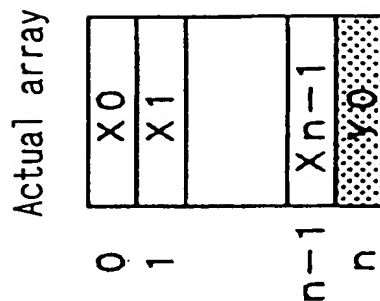
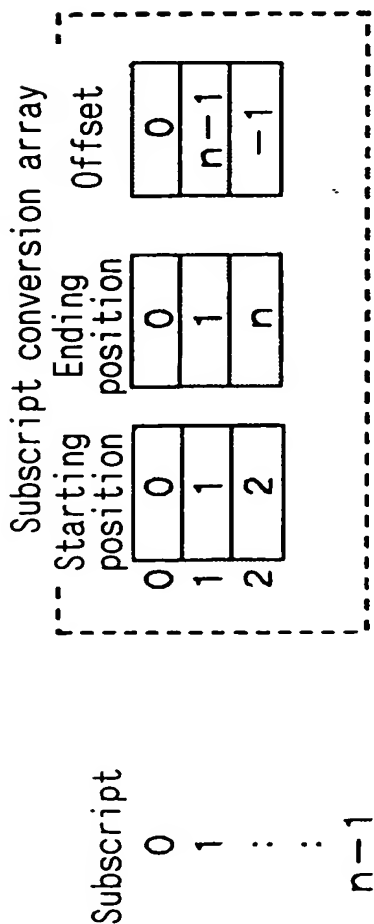
Insertion of an element into an array of size "n"

FIG. 10B



Logical relationship between subscripts and stored values

FIG. 10C



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FIG. 11

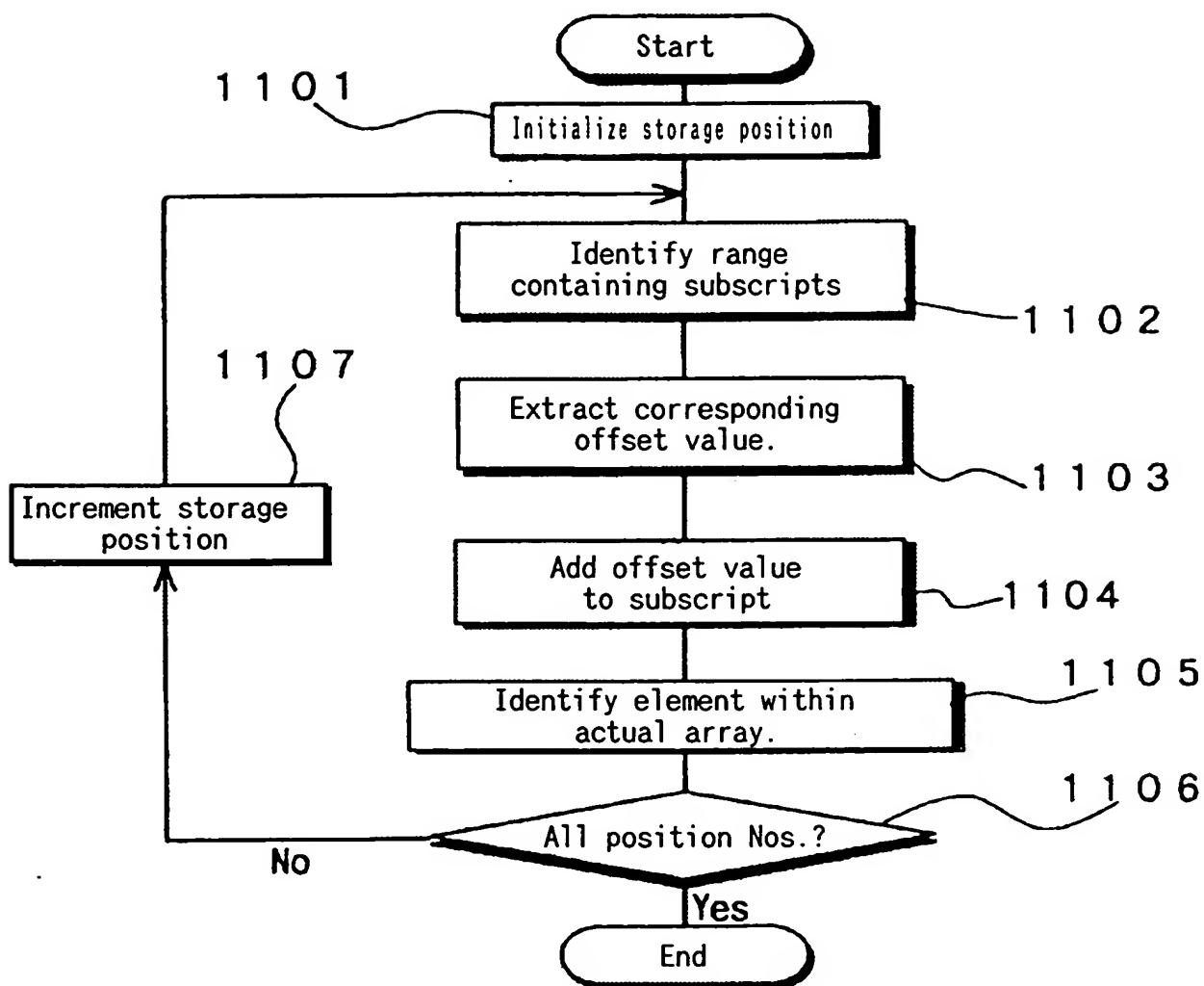
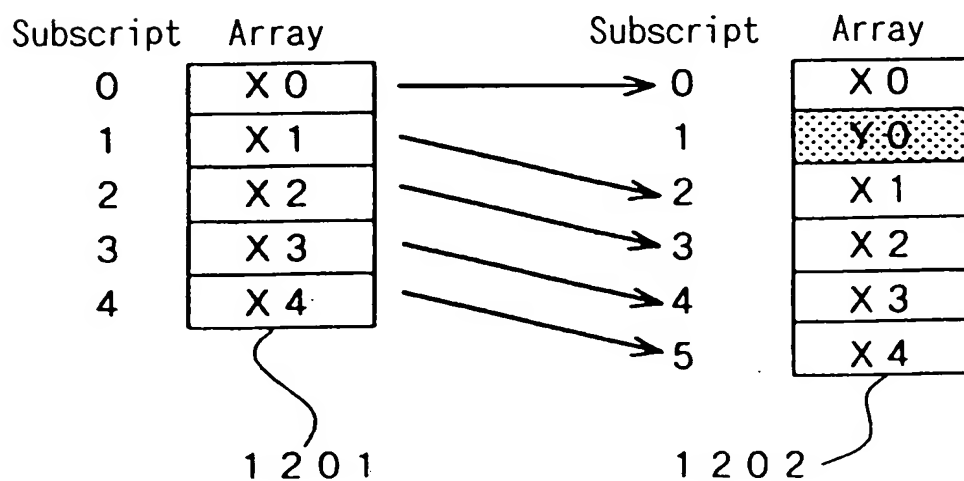
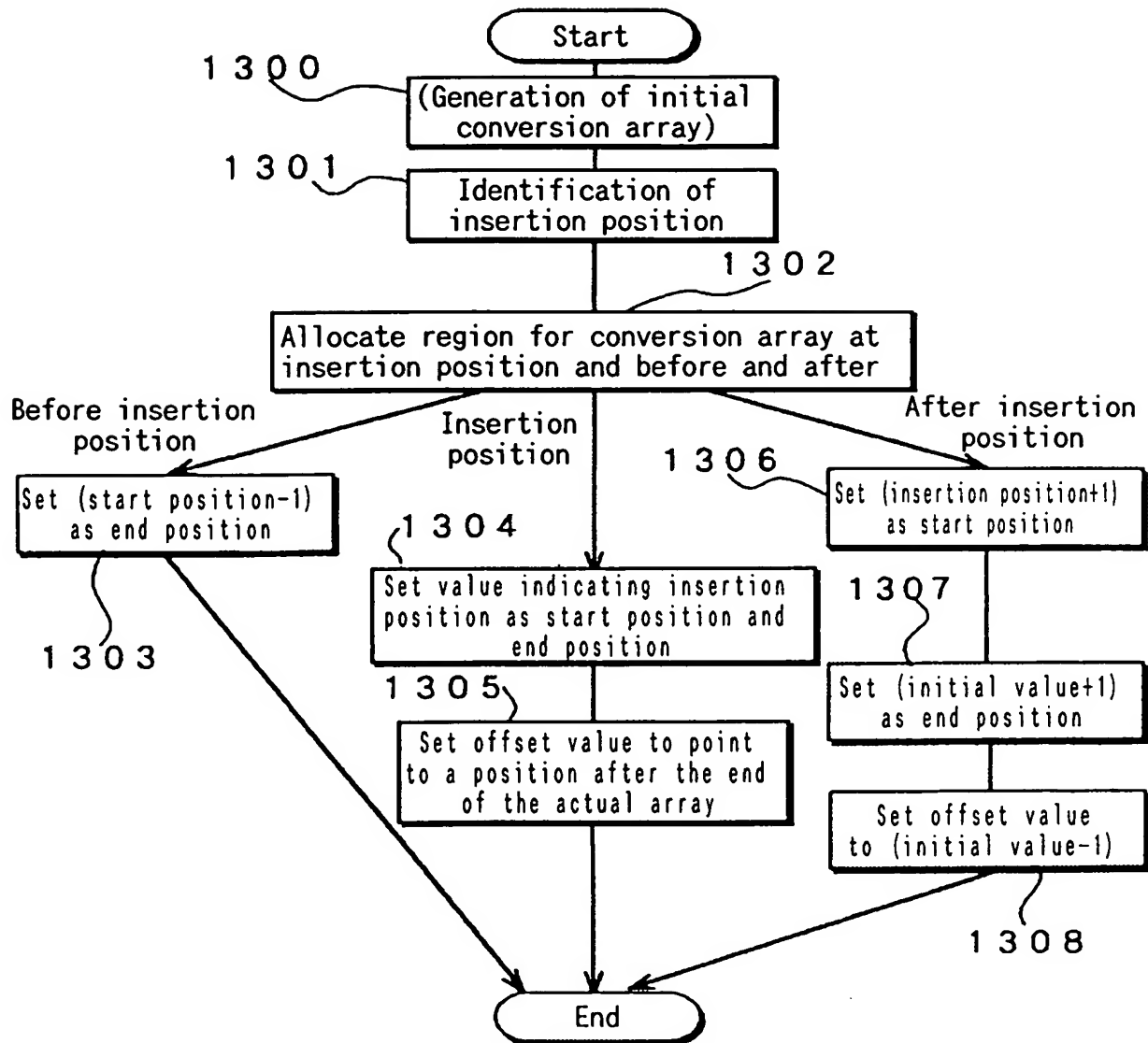


FIG. 12



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FIG. 13



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FIG. 14

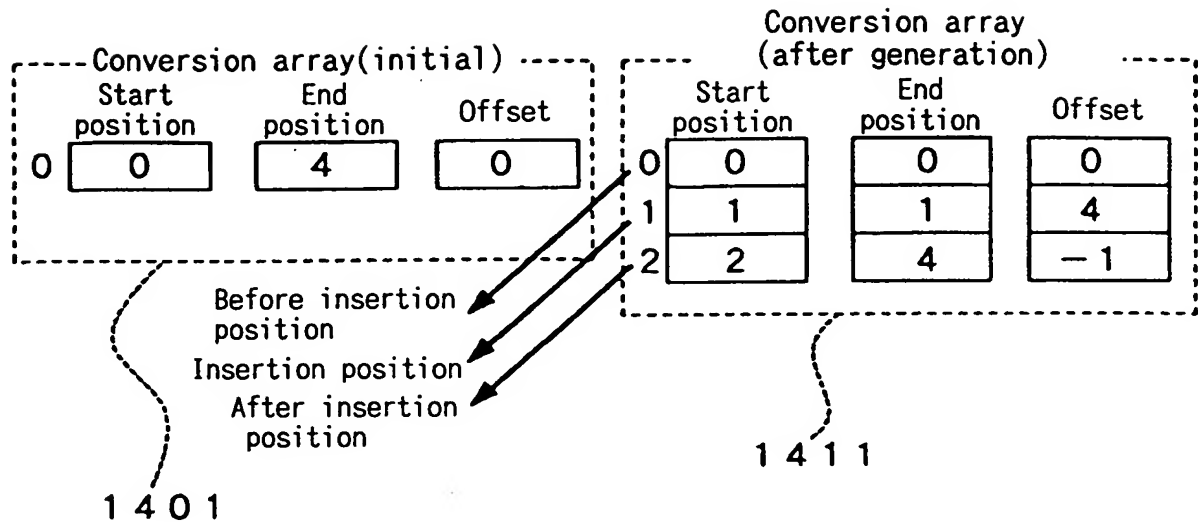
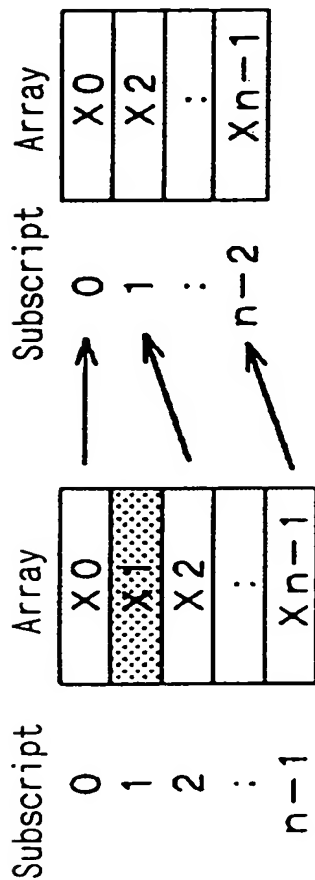


FIG. 15A



Deletion of an element from an array of size "n"

FIG. 15C

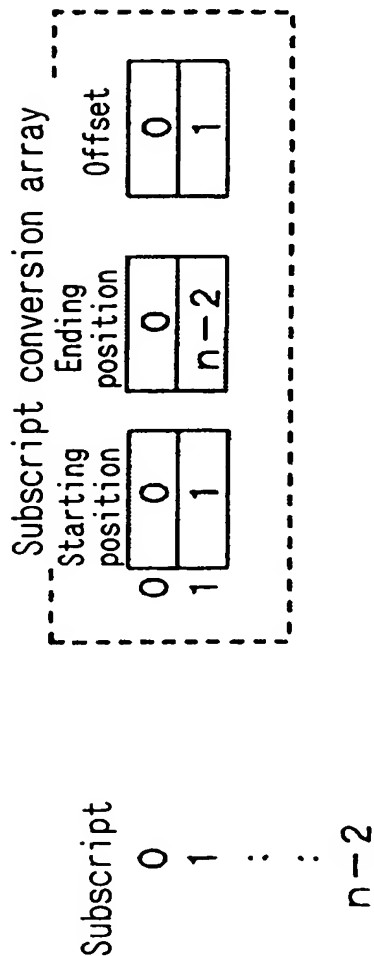
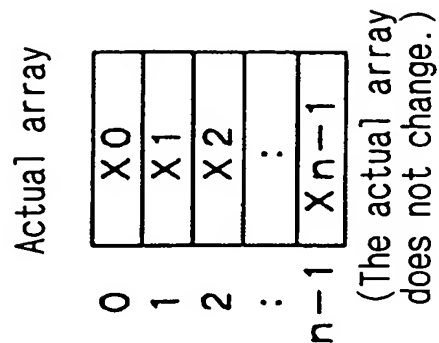


FIG. 15B

Subscript	Stored value
0	X0
1	X2
2	X3
:	:
n-2	Xn-1

Logical relationship between subscripts and stored values



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FIG. 16A

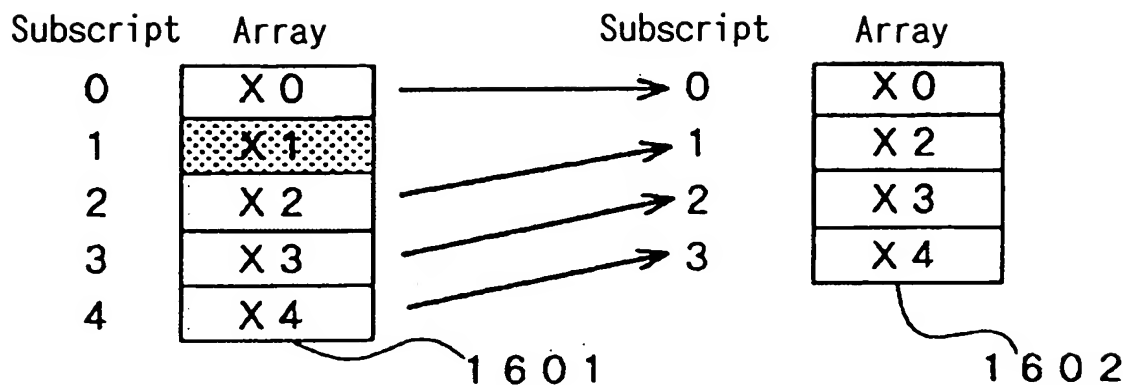
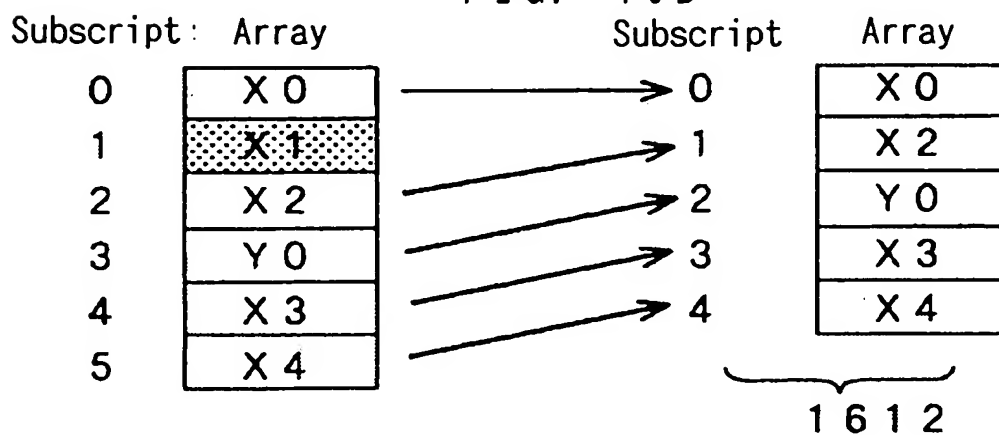
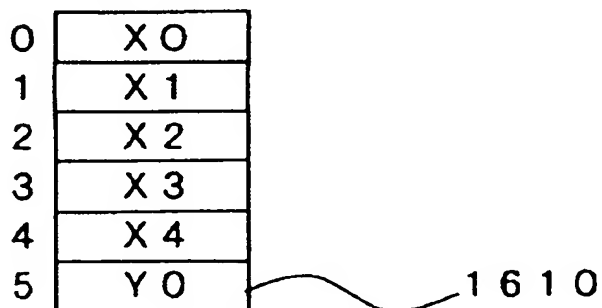


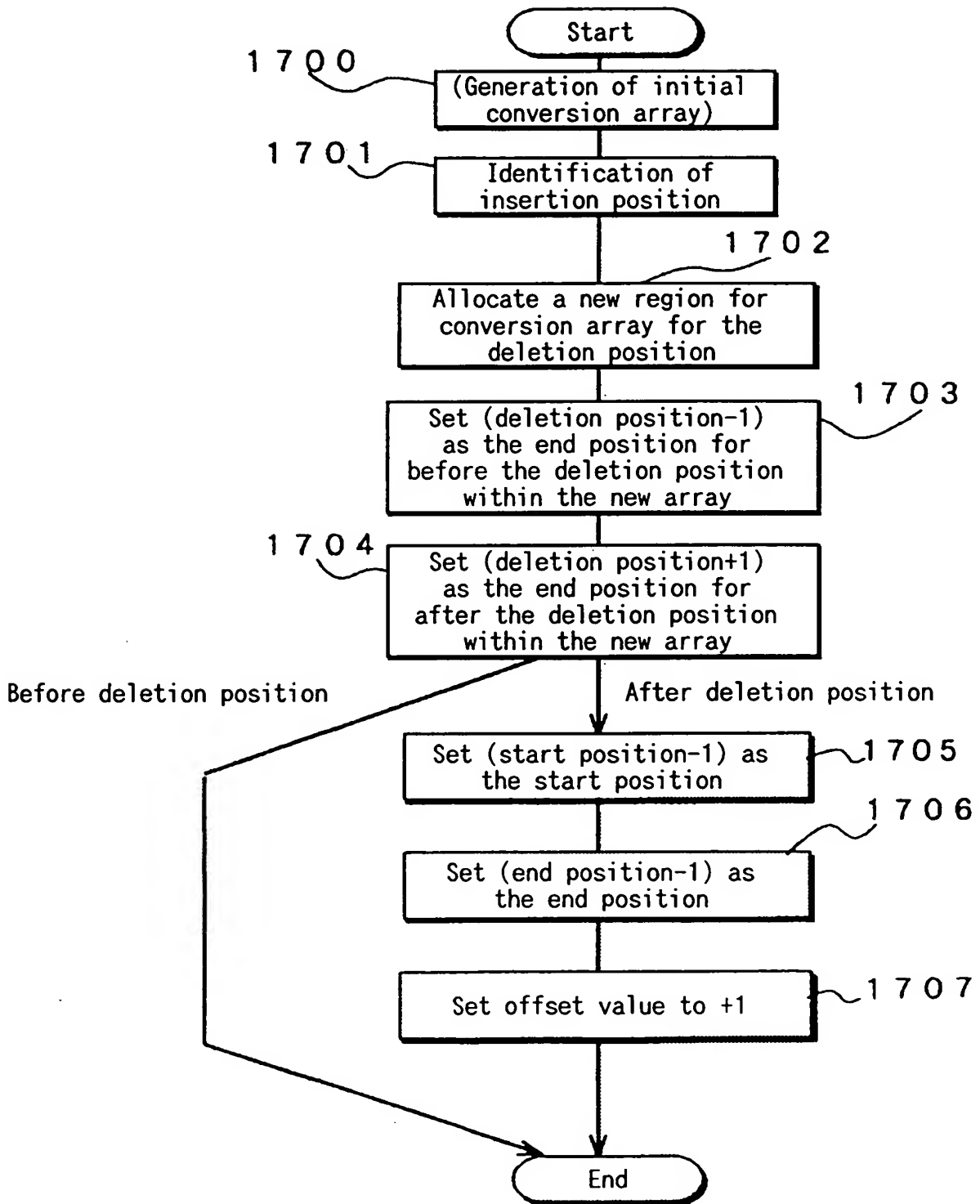
FIG. 16B

Actual
array

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FIG. 17



208270" T E 284001

FIG. 18A

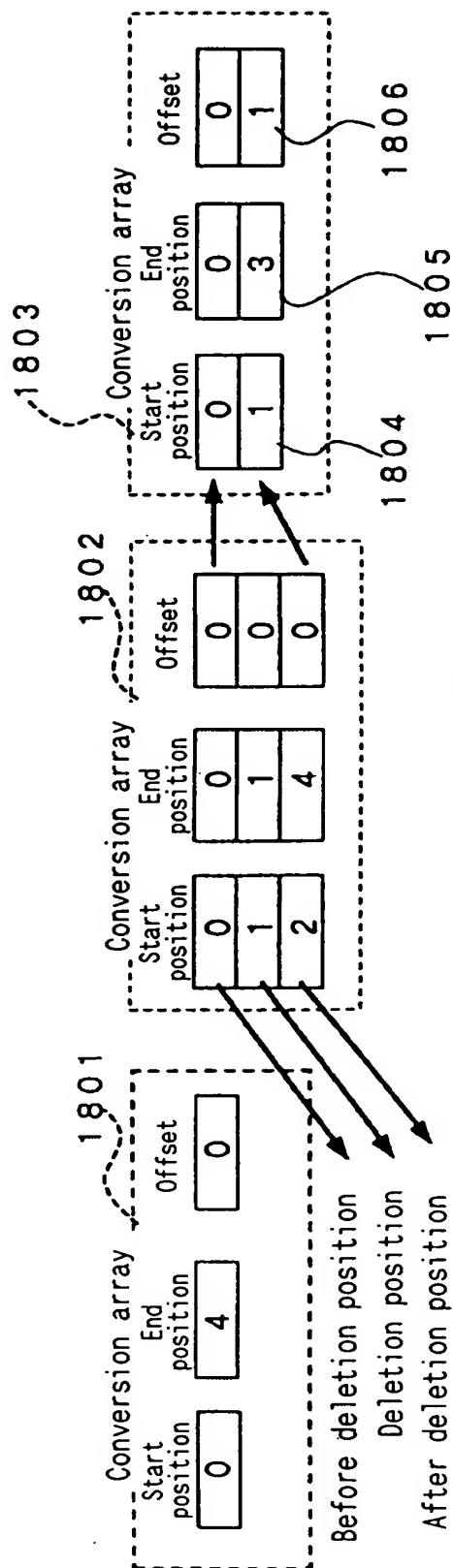


FIG. 18B

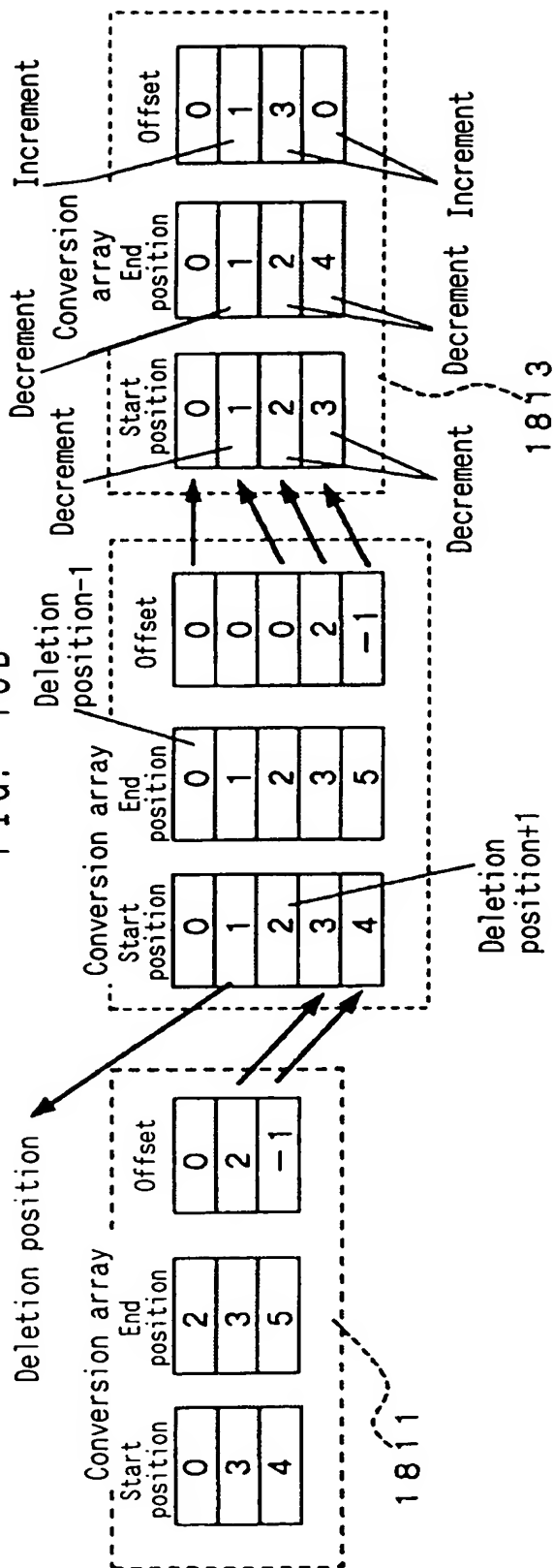


FIG. 19

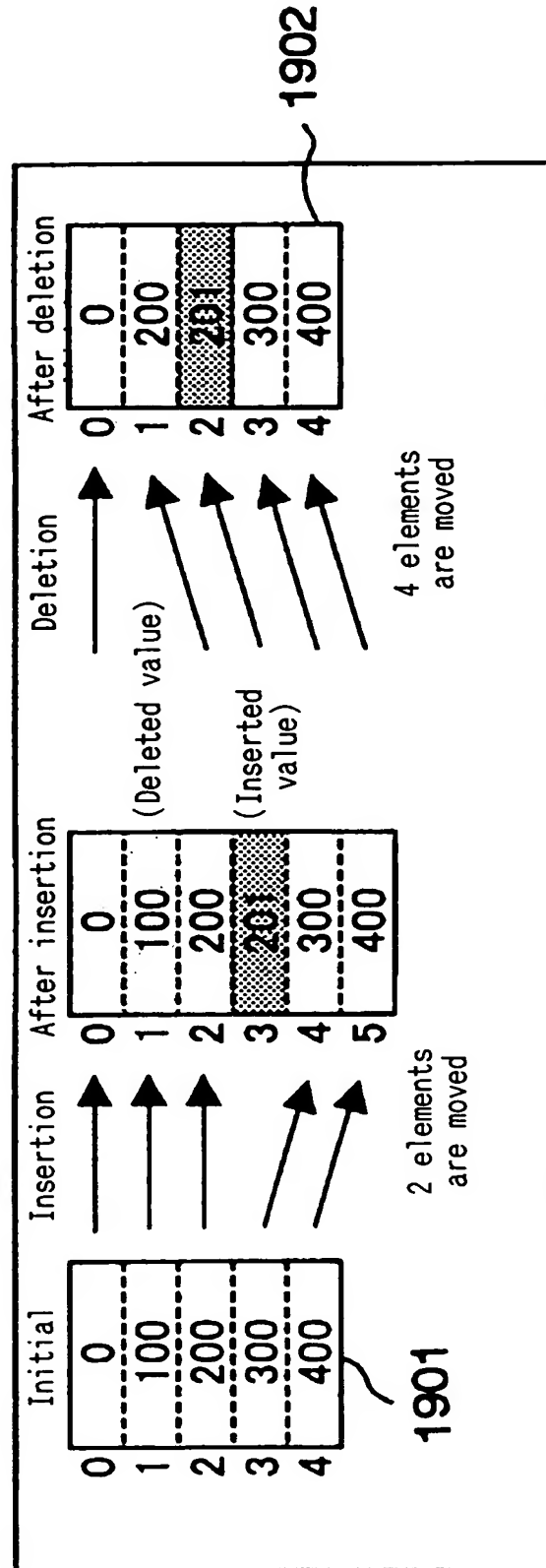
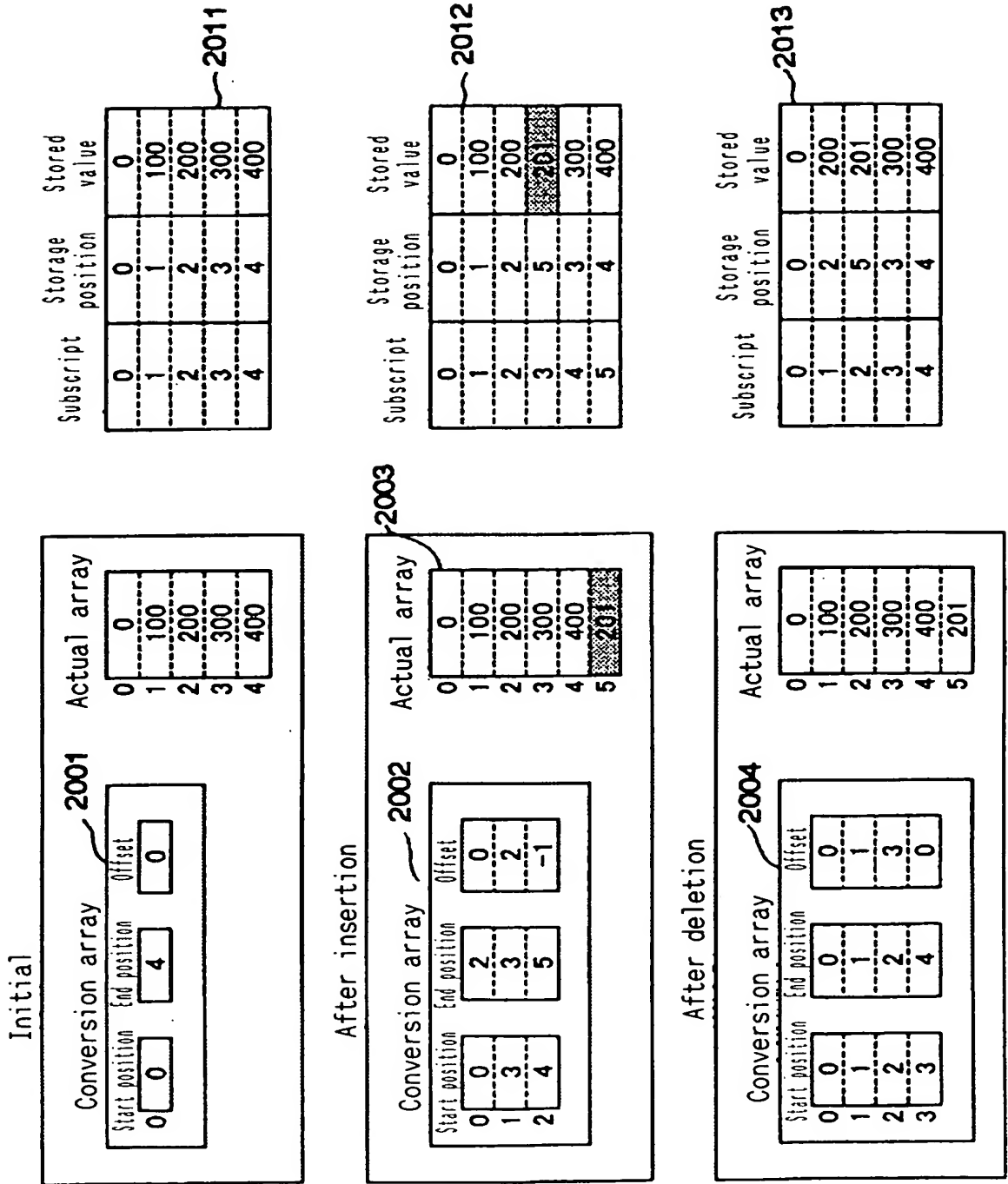


FIG. 20



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FIG. 21A

Conversion array (initial)

	Start position	End position	Offset
0	0	2	0
1	3	3	2
2	4	5	-1

2 1 0 1

FIG. 21B

Conversion array

	End position	Offset
0	0	0
1	3	2
2	4	-1

2 1 0 2

(End position only; logic: \leq)

FIG. 21C

Conversion array

	Start position	Offset
0	2	0
1	3	2
2	5	-1

(Start position only; logic: \geq)

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FIG. 22

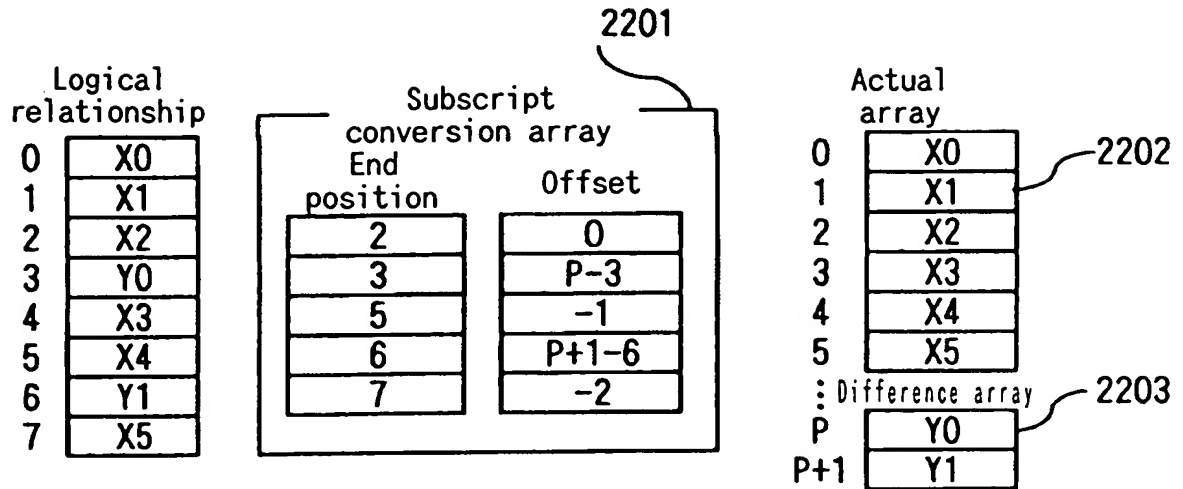
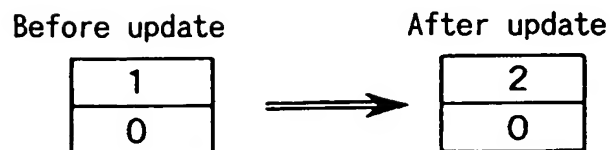
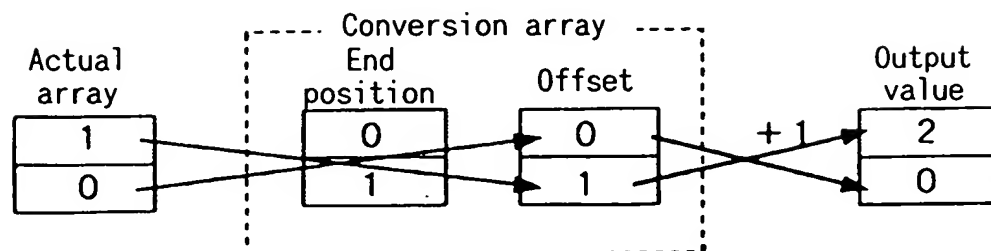


FIG. 23A



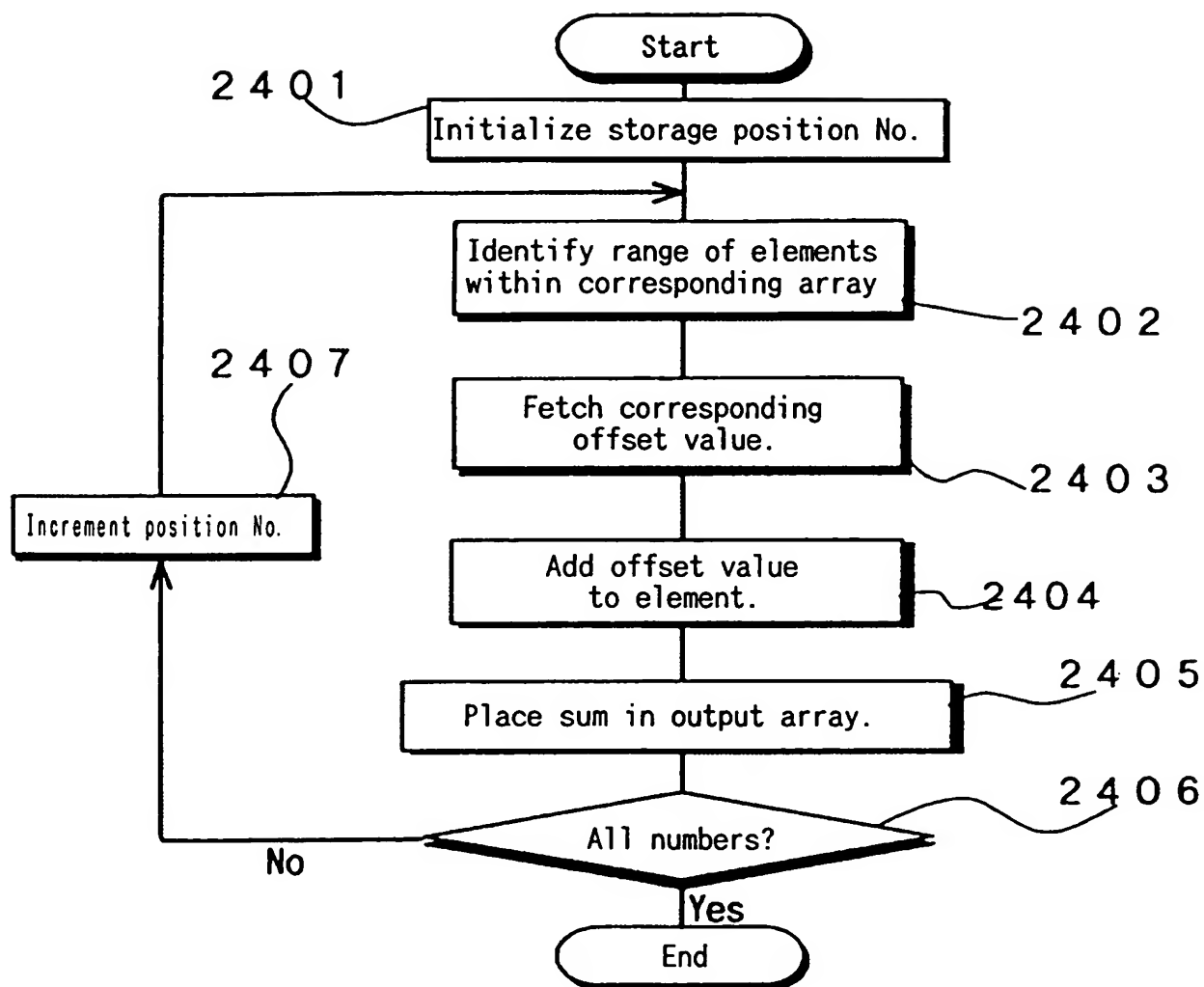
Increment values of 1 or more in the array.

FIG. 23B



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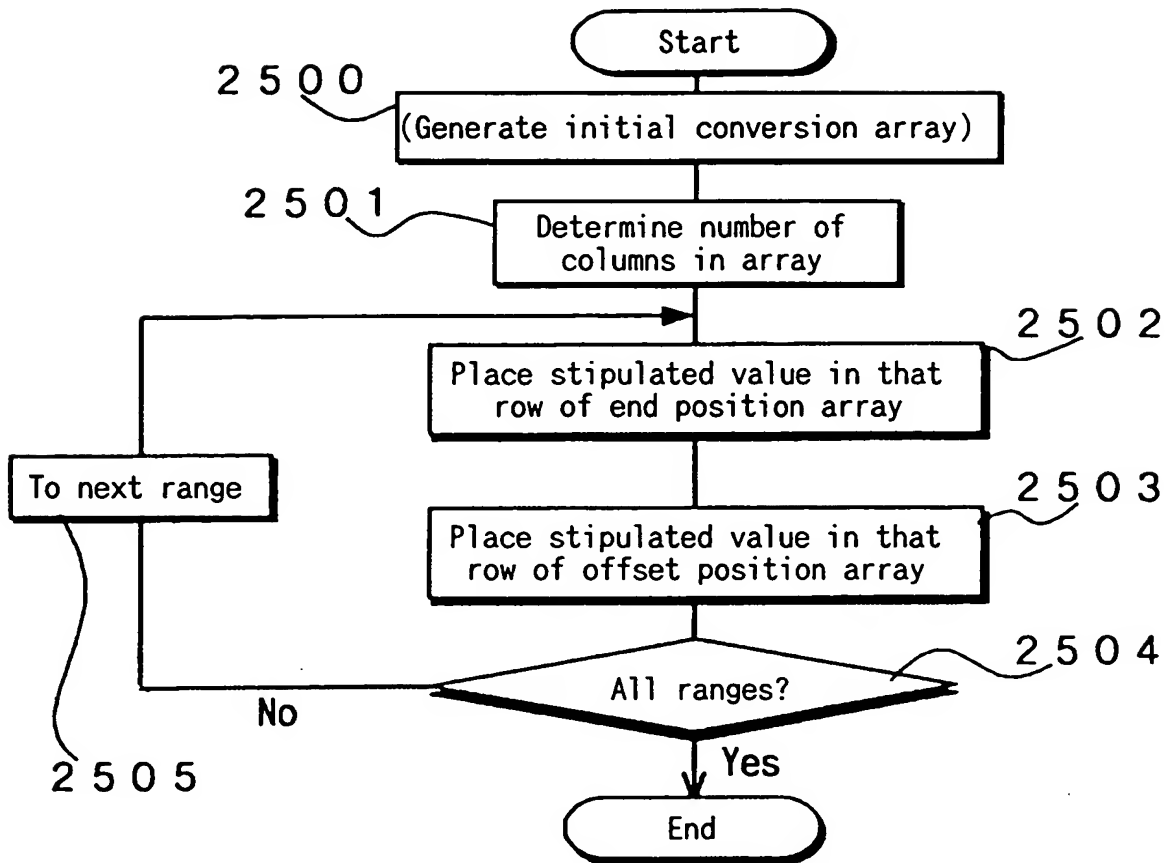
FIG. 24



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FIG. 25



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FIG. 26A

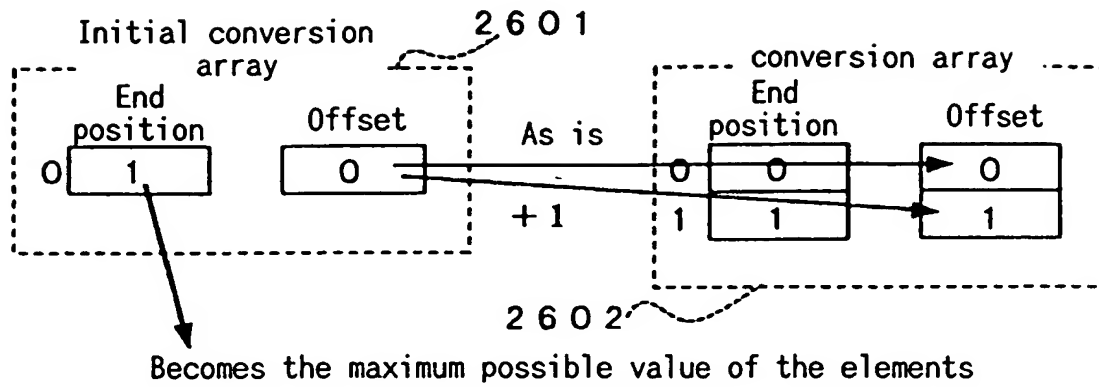
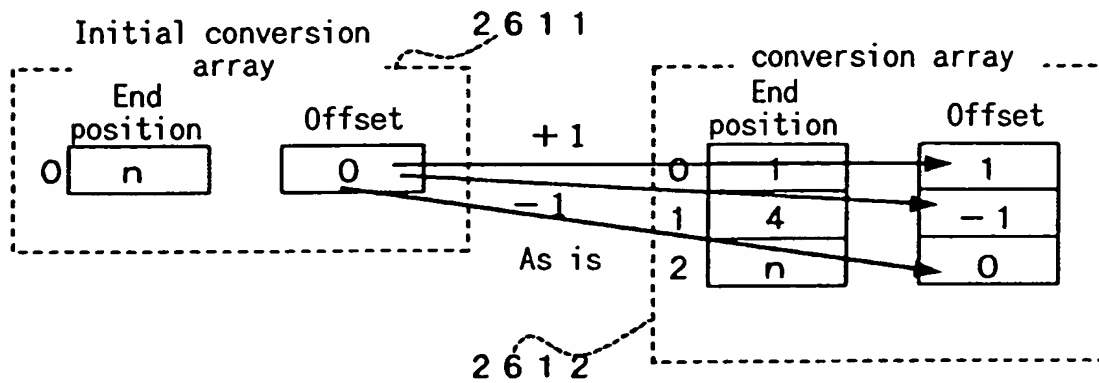


FIG. 26B



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FIG. 27

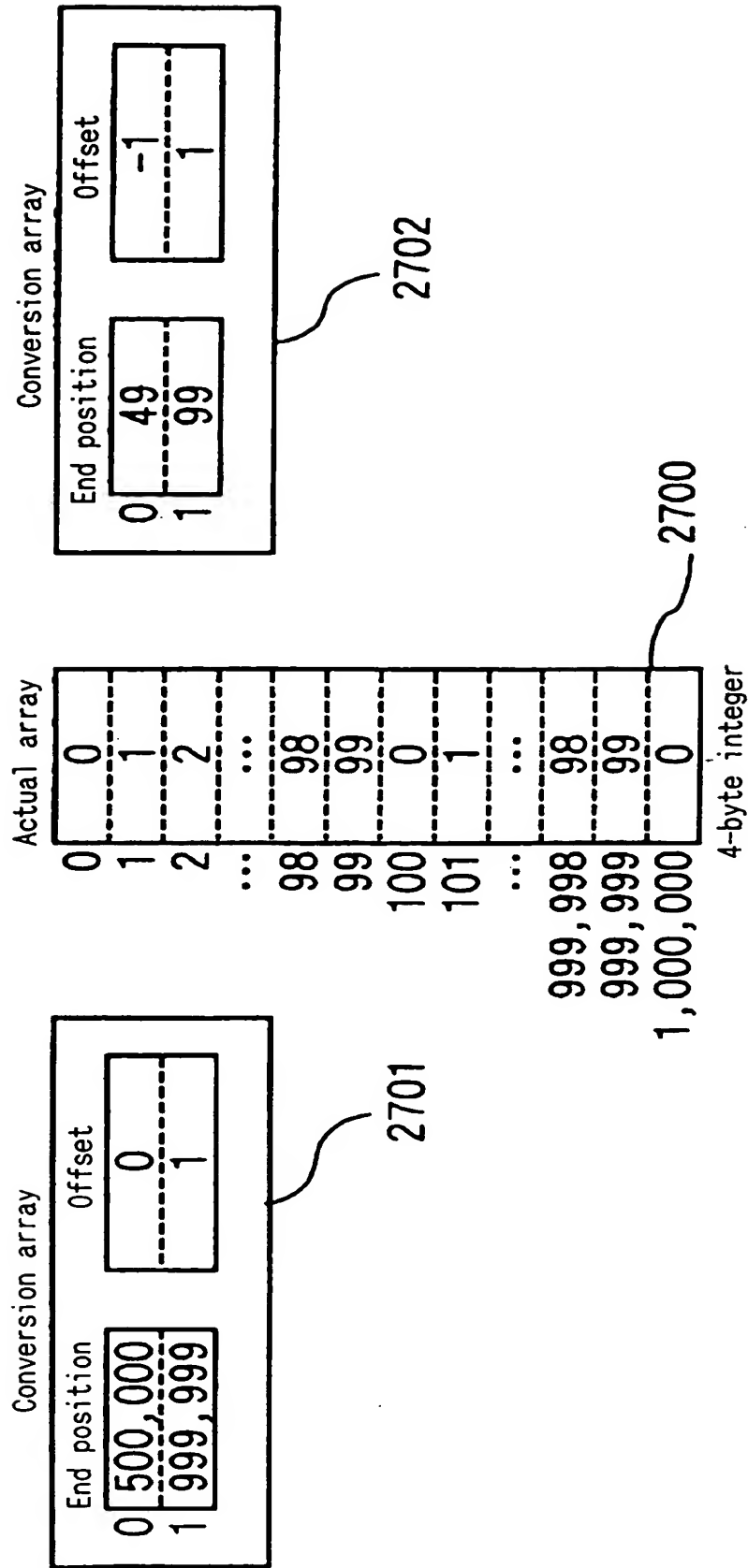


FIG. 28A

<< Display image >>

Personal name table
n Records (=3)

Member surname	Member given name
Smith	John
Ford	Tom
Smith	Ken

① ②

FIG. 28B

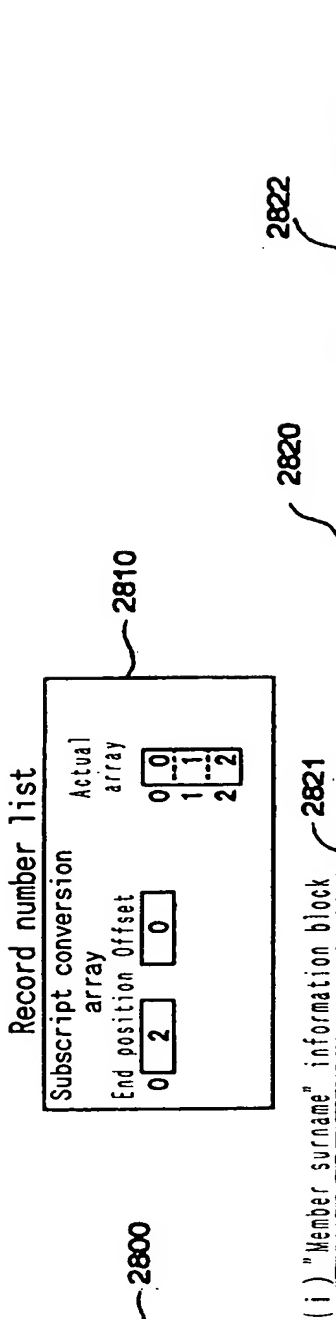


FIG. 28C

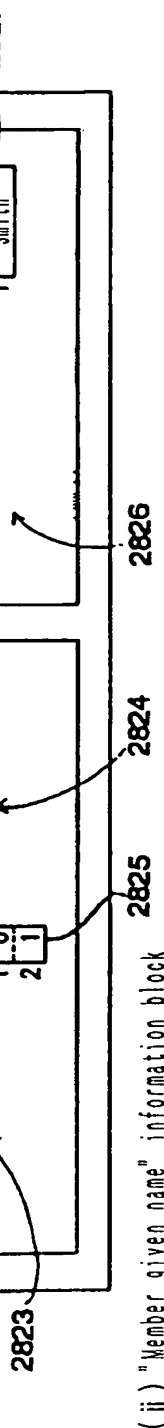


FIG. 28D

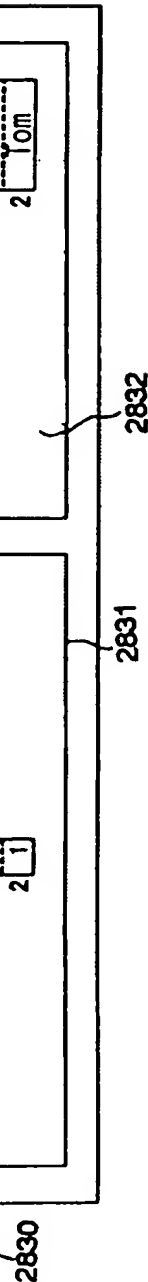


FIG. 29A

FIG. 29B

<< Display image >>

Record to be deleted

Member surname	Member given name
Smith	John
Ford	Tom
Smith	Ken

(i) (ii)

=>

Member surname	Member given name
Smith	John
Smith	Ken

(i) (ii)

FIG. 30A

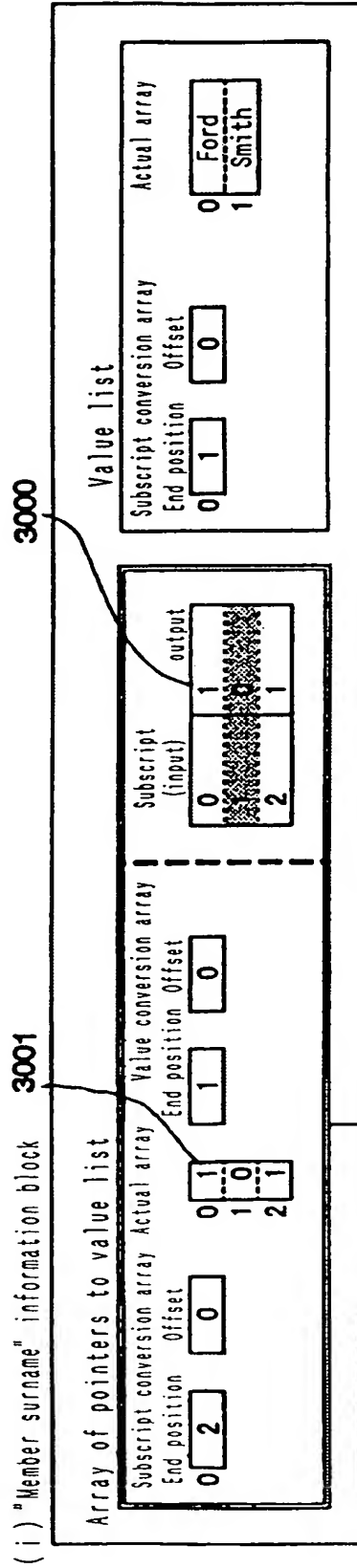


FIG. 30B 3010

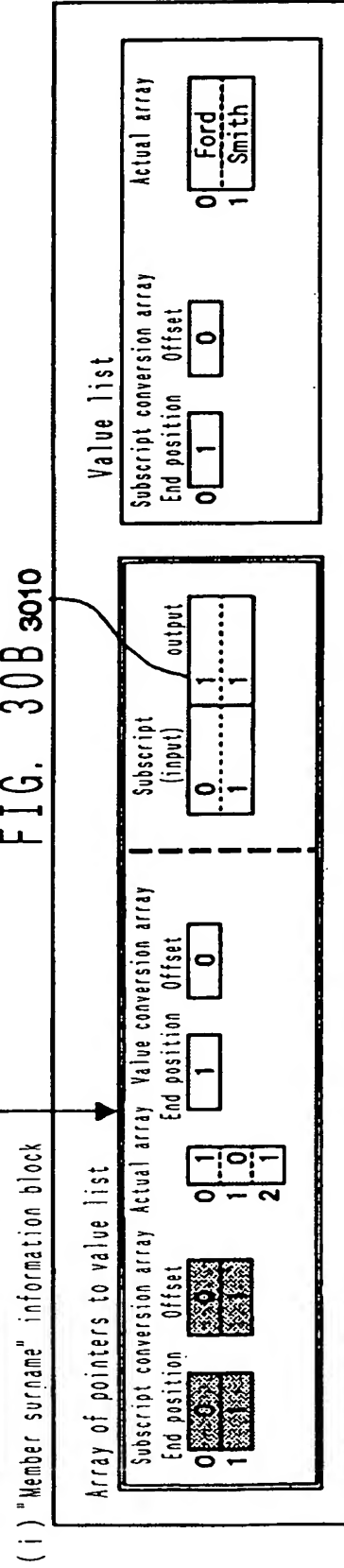


FIG. 31A

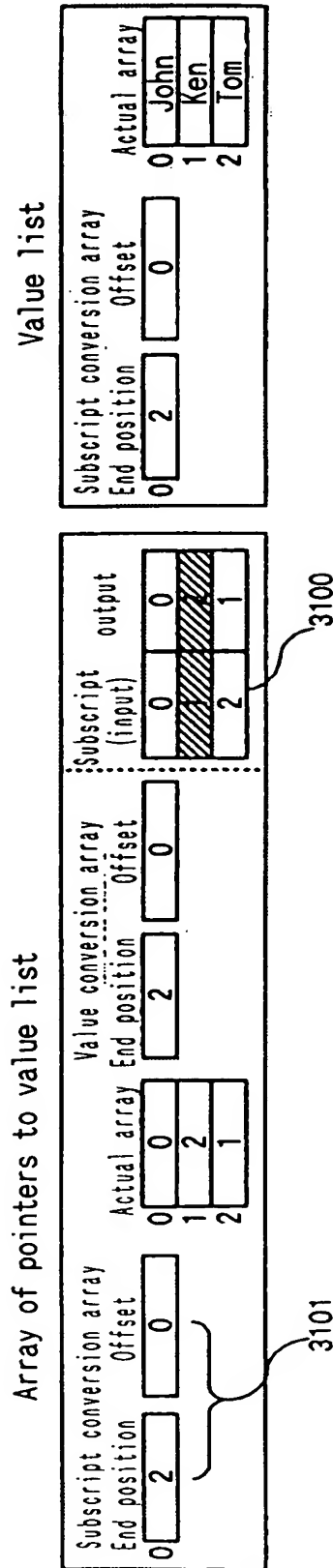


FIG. 31B

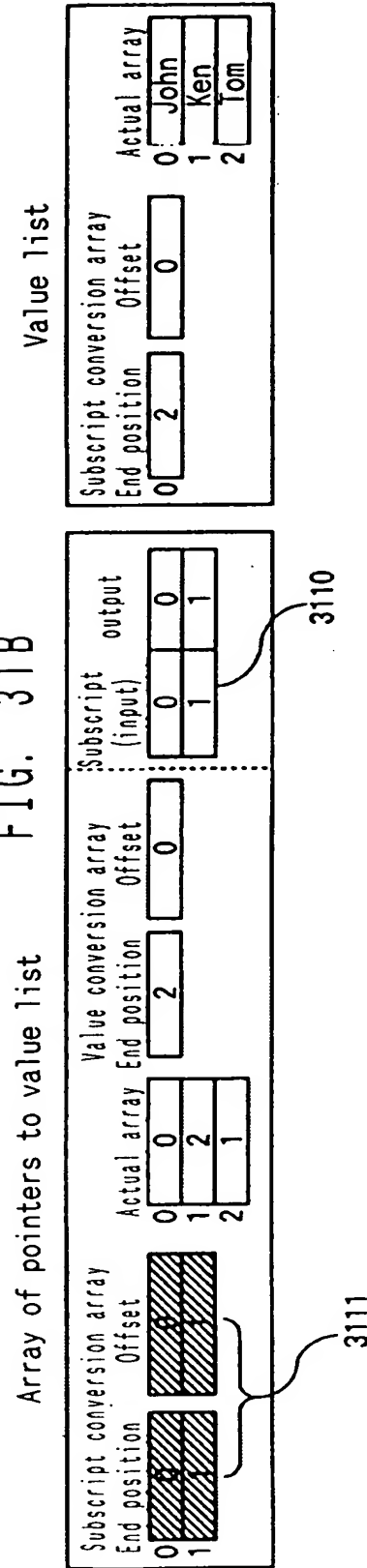
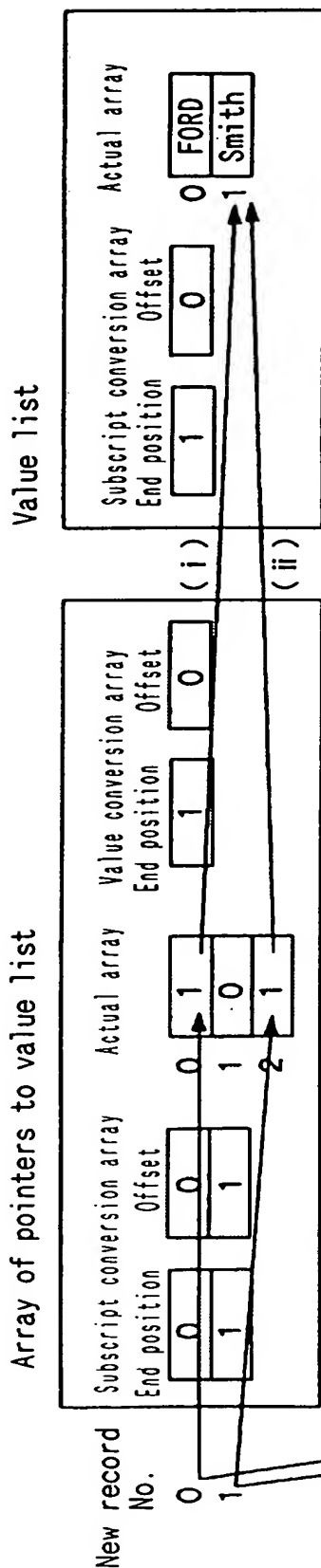


FIG. 32

"Member surname" information block



"Member given name" information block

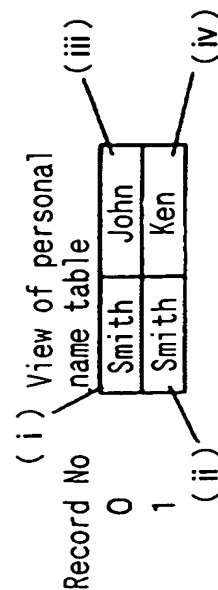
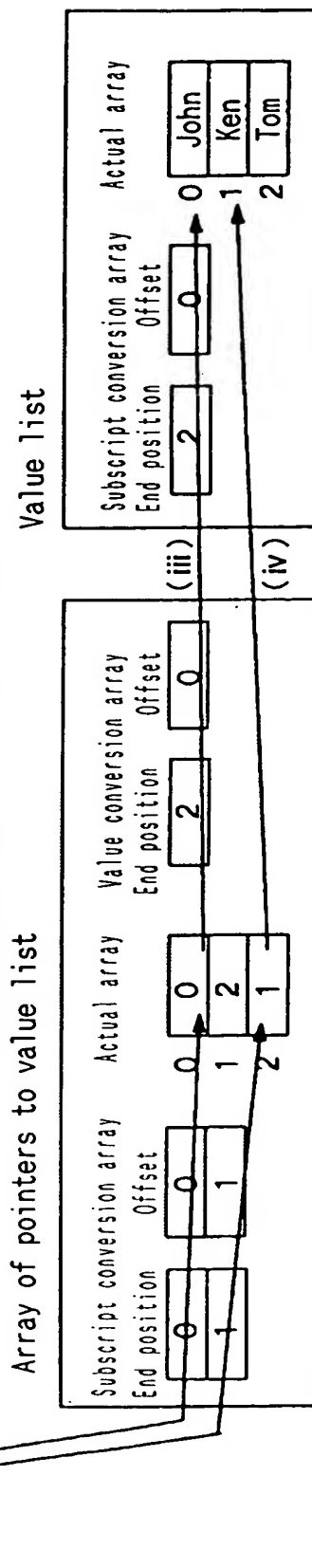


FIG. 33A

FIG. 33B

<< Display image >>

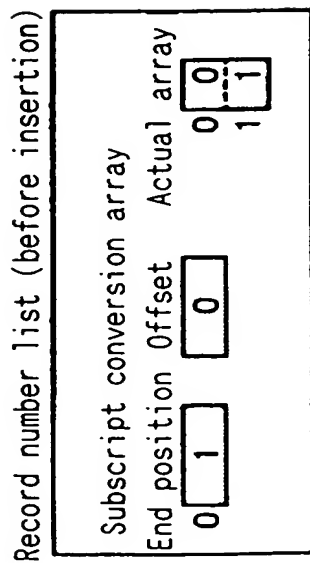
Personal name table n Records (n=3)	
Member surname	Member given name
Smith	Johk
Smith	Ken
(i)	(ii)

=>

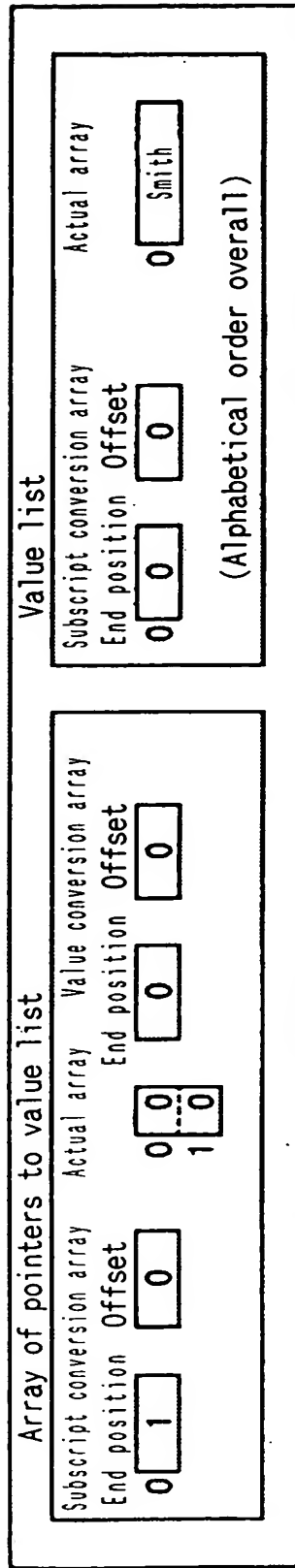
Personal name table n Records (n=3)	
Member surname	Member given name
Smith	Johk
Ford	Jonny
Smith	Ken
(i)	(ii)

Inserted record

FIG. 34



(i) "Member surname" information block (before insertion)



(ii) "Member given name" information block (before insertion)

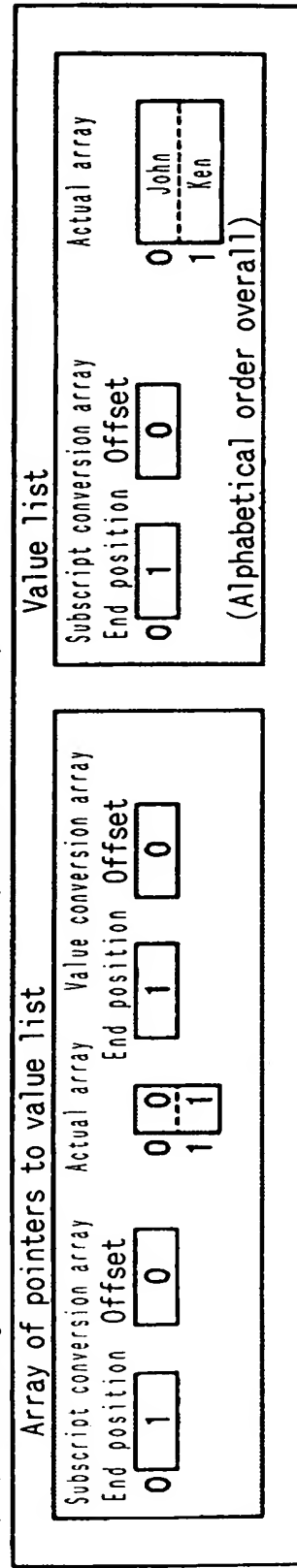
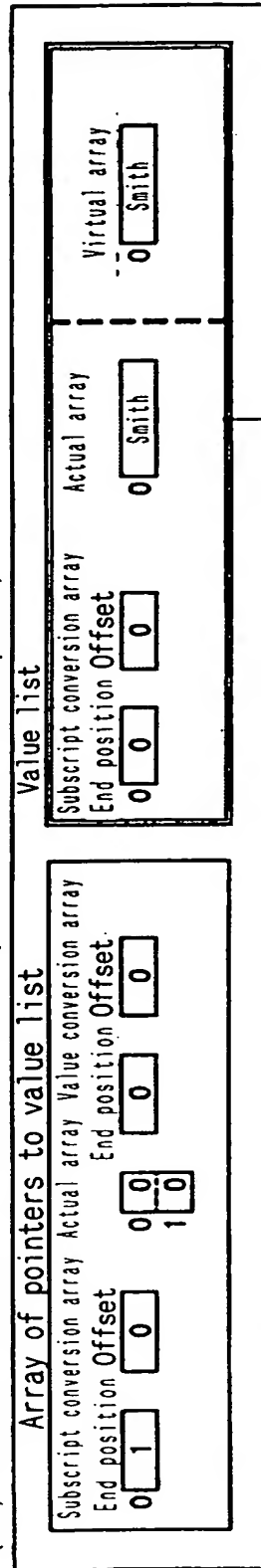


FIG. 35A

(i) "Member surname" information block (before value list update)



(i) "Member surname" information block (after value list update)

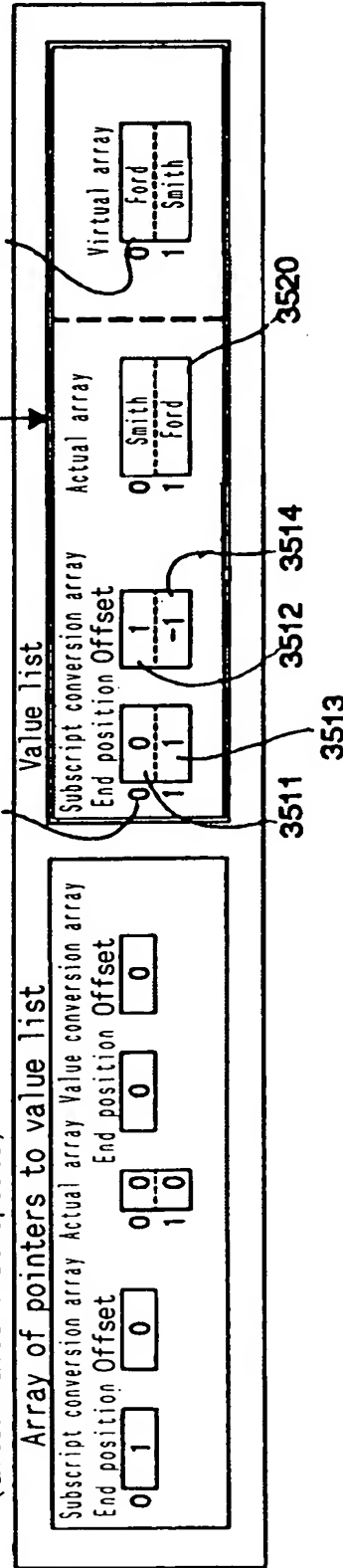
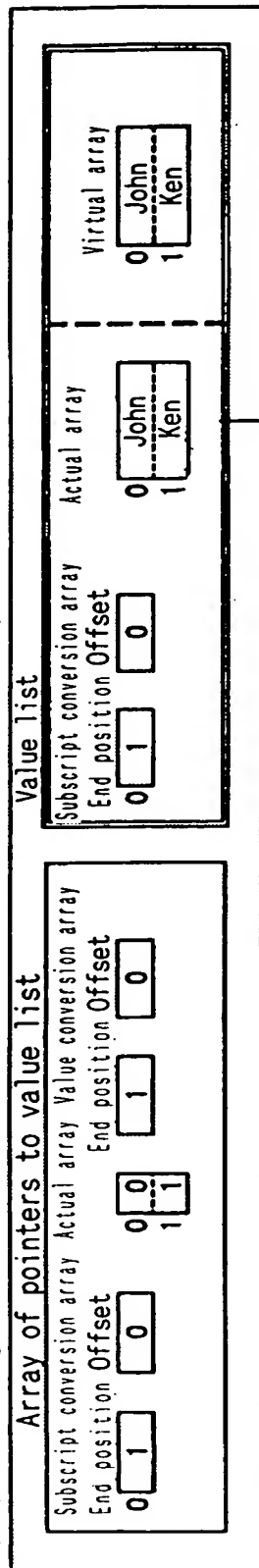


FIG. 36A

(ii) "Member given name" information block (before value list update)



(ii) "Member given name" information block (before value list update)

FIG. 36B

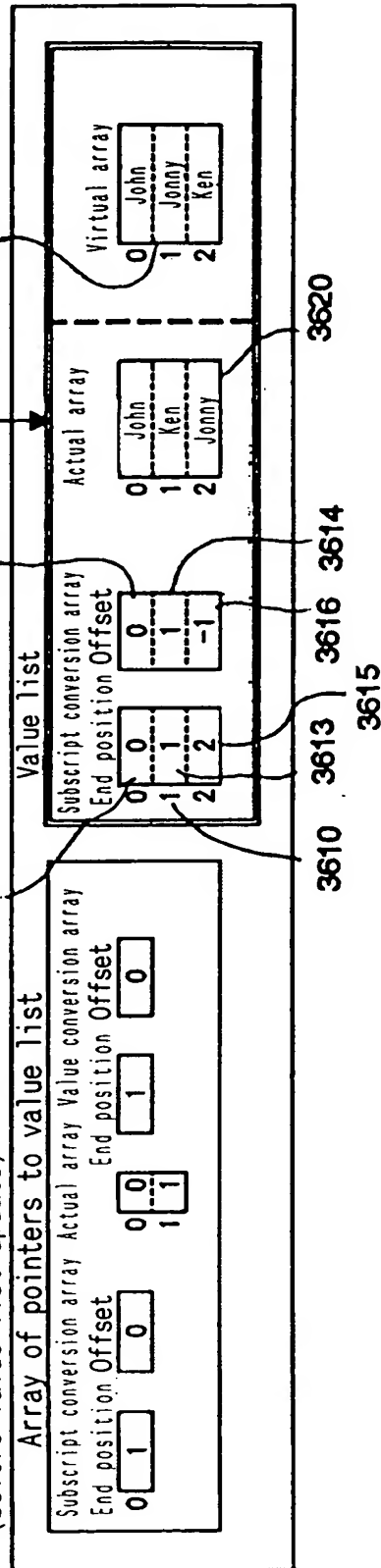


FIG. 37A

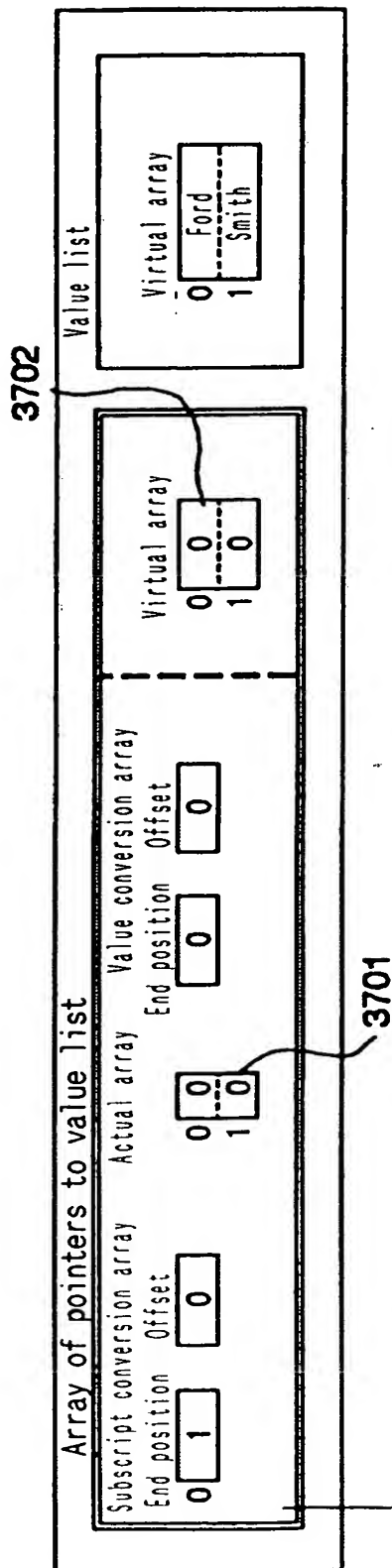
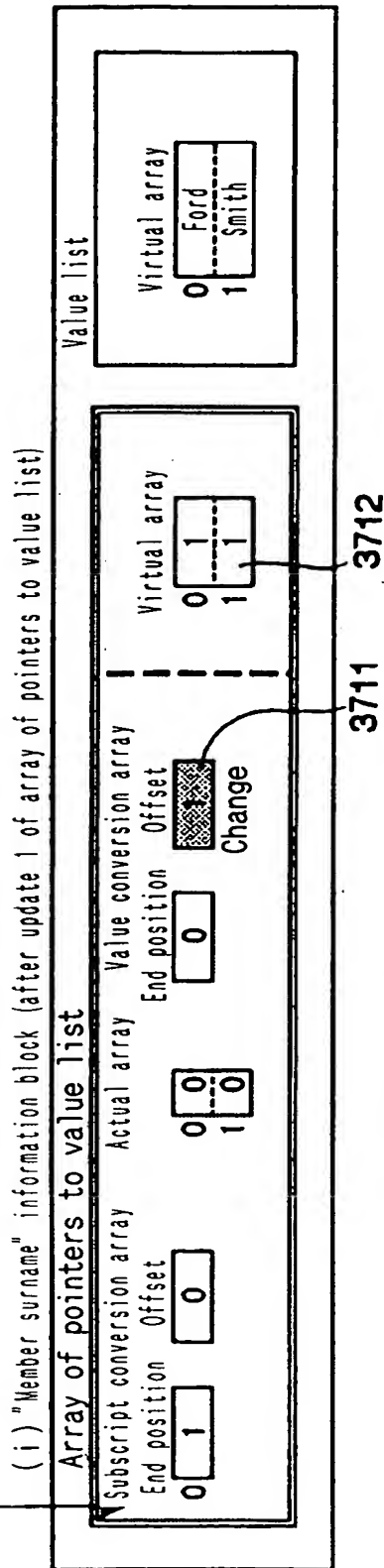


FIG. 37B



(i) "Member surname" information block (after update 1 of array of pointers to value list)

FIG. 38A

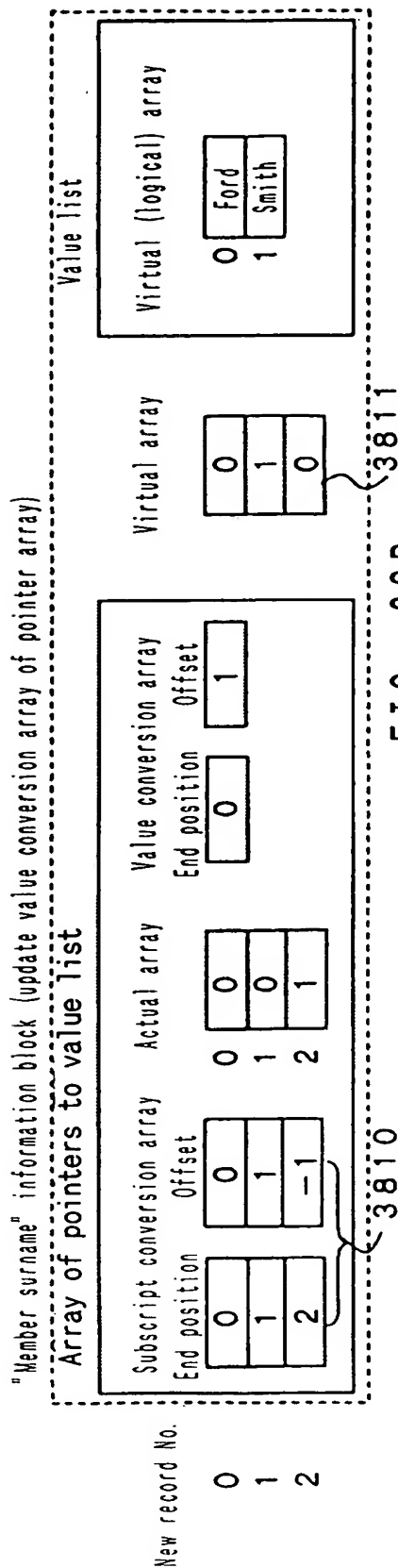


FIG. 38B

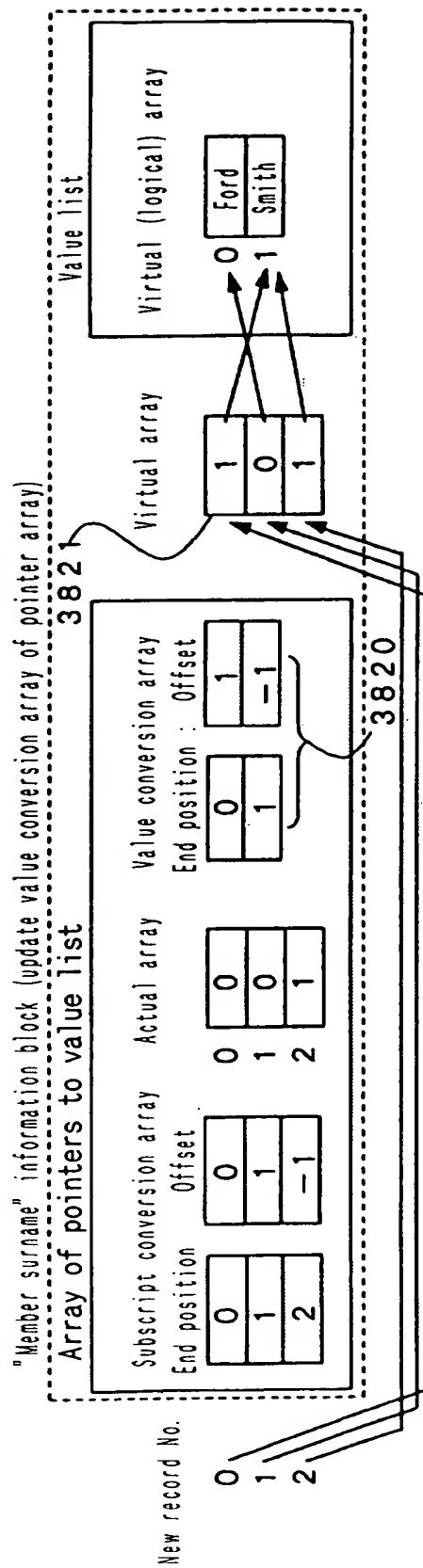


FIG. 39A

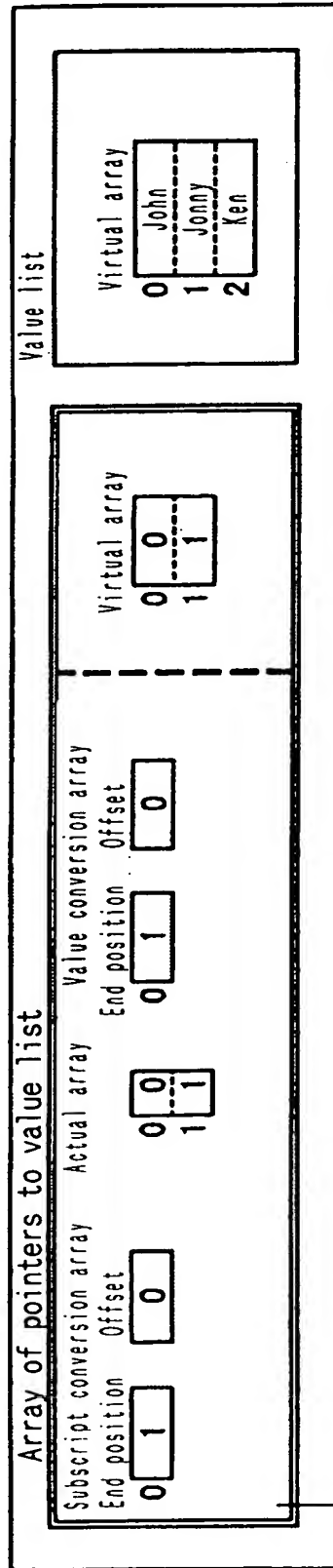
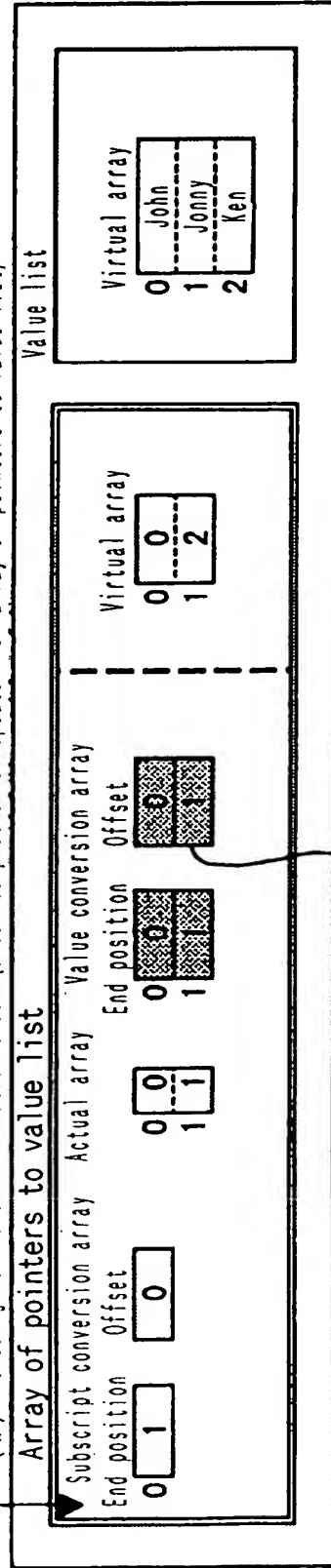


FIG. 39B

(ii) "Member given name" information block (after completion of update 1 of array of pointers to value list)



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FIG. 40A

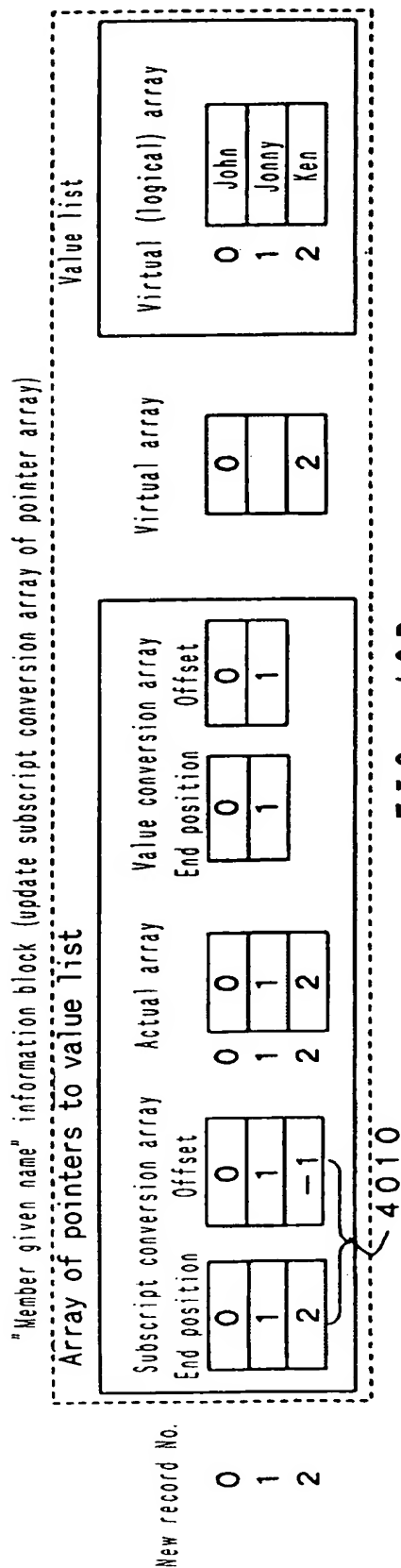


FIG. 40B

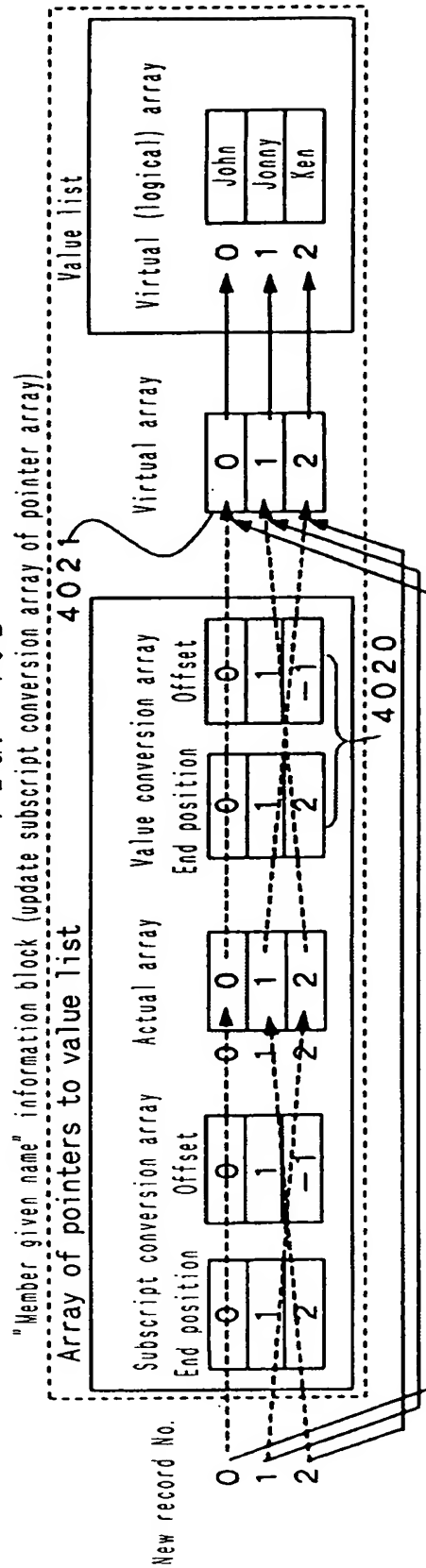
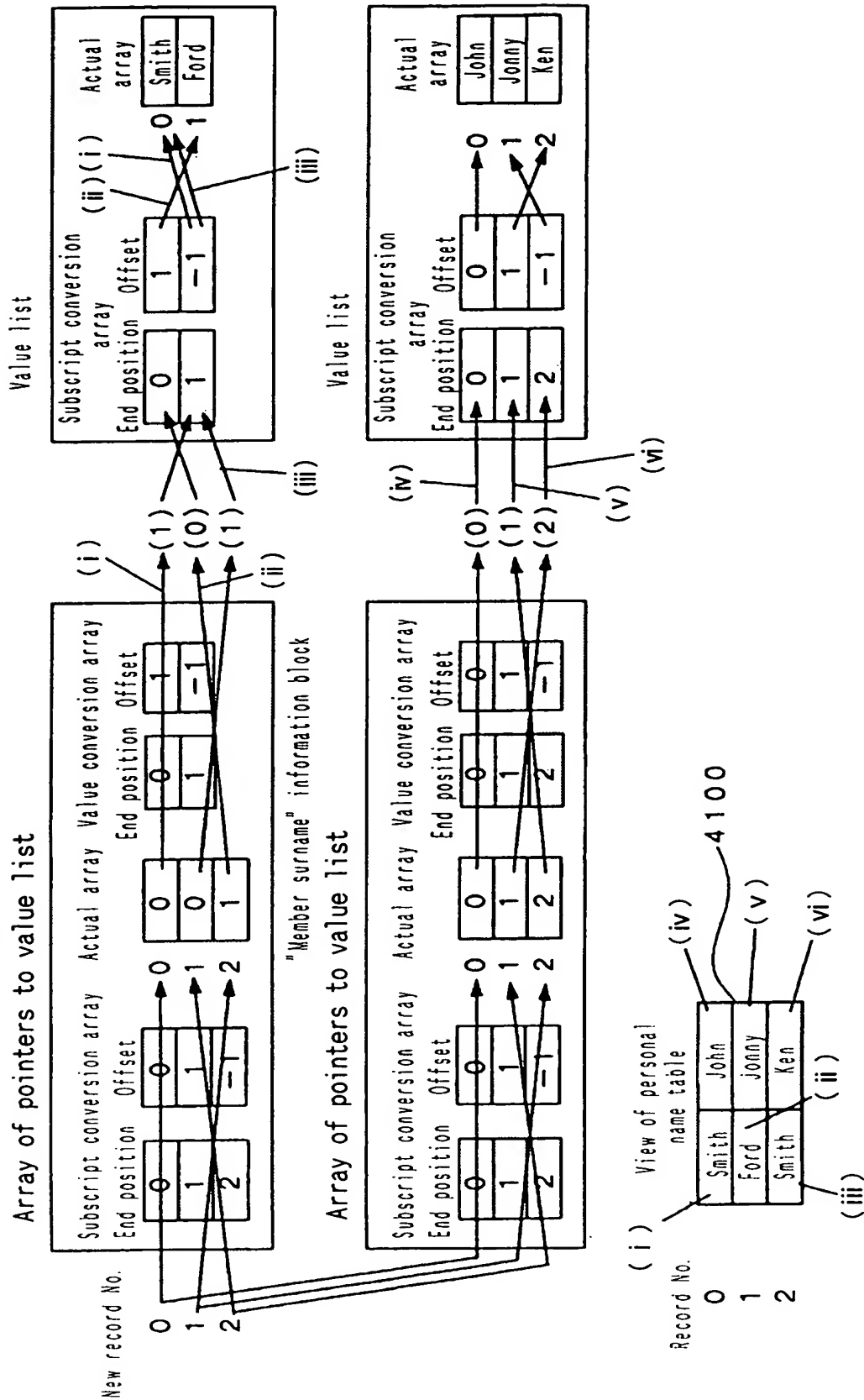


FIG. 41

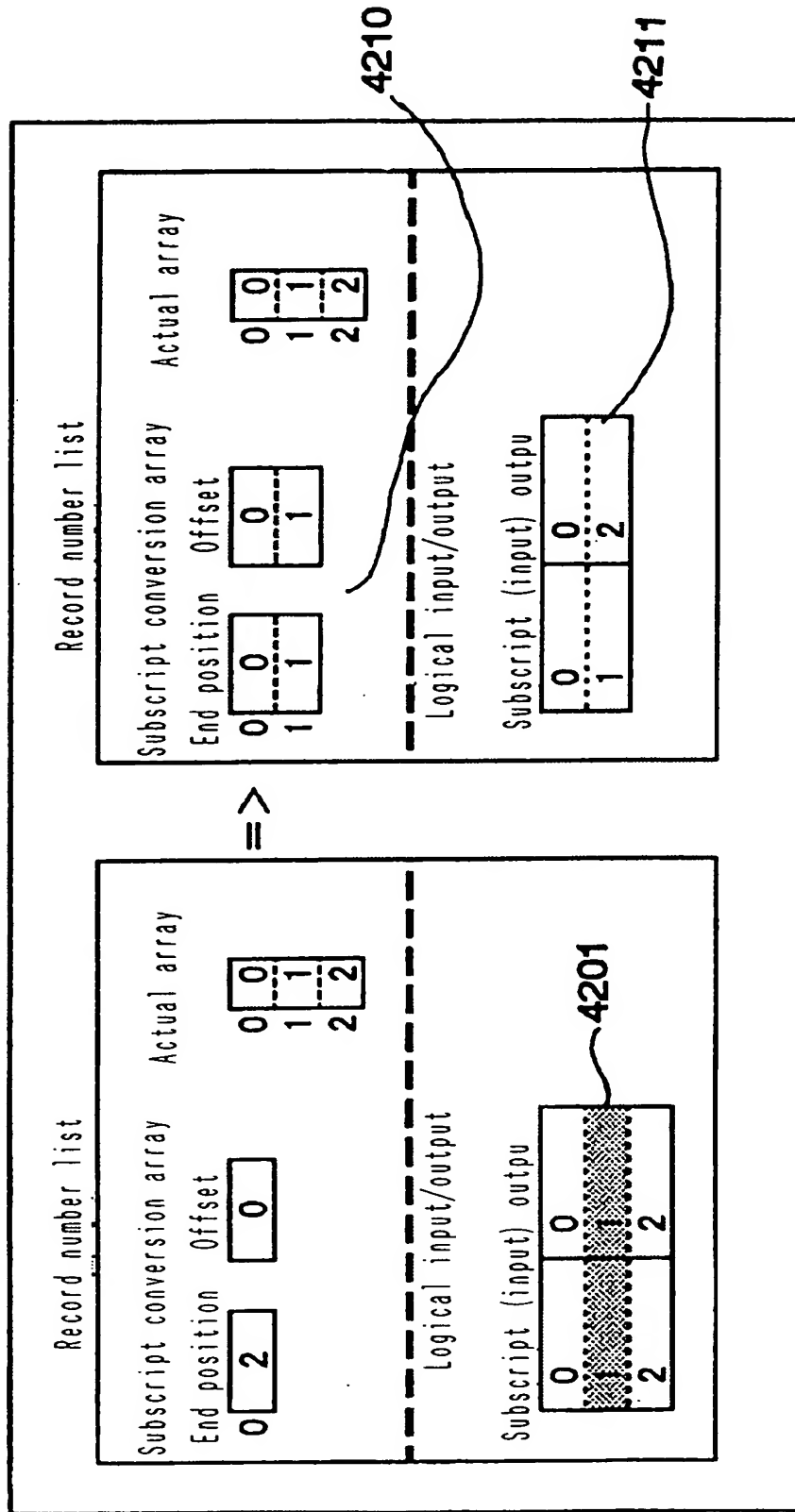
"Member surname" information block

Array of pointers to value list



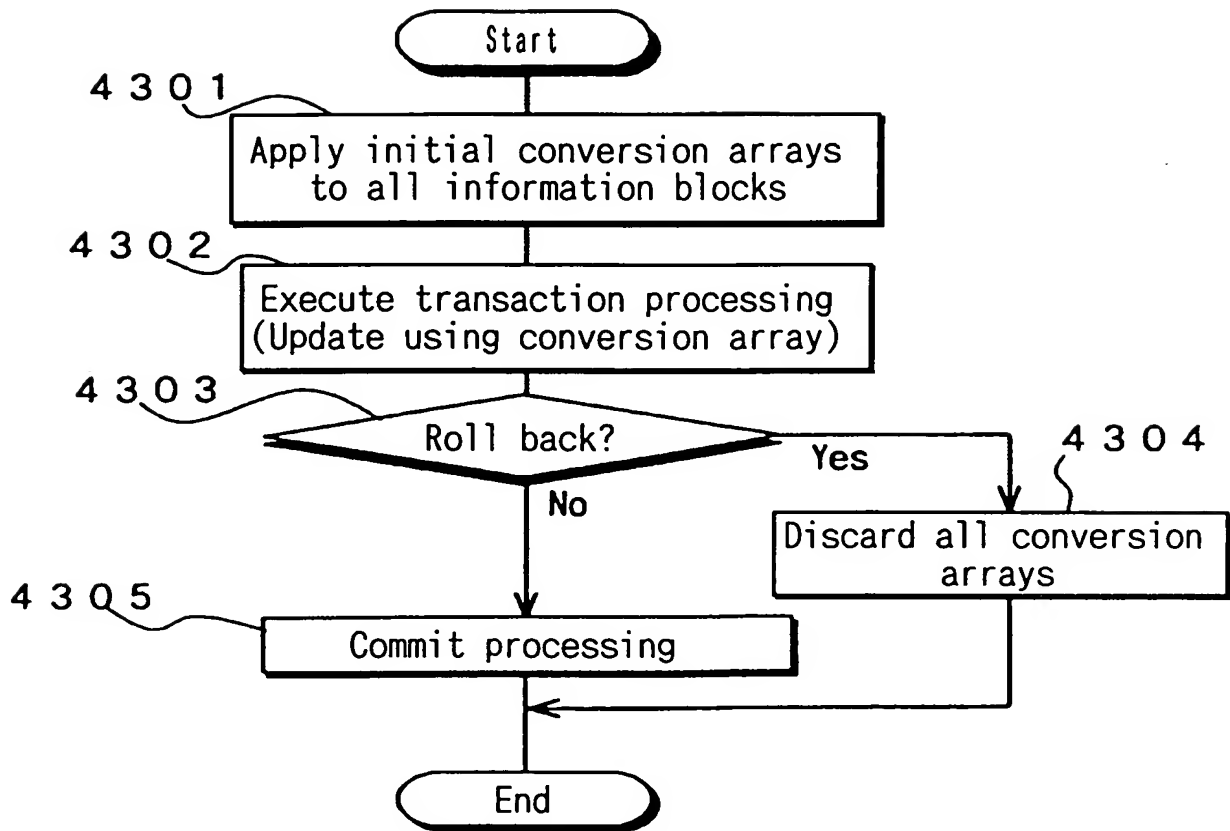
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FIG. 42



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FIG. 43



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FIG. 44

Information block for customer balances

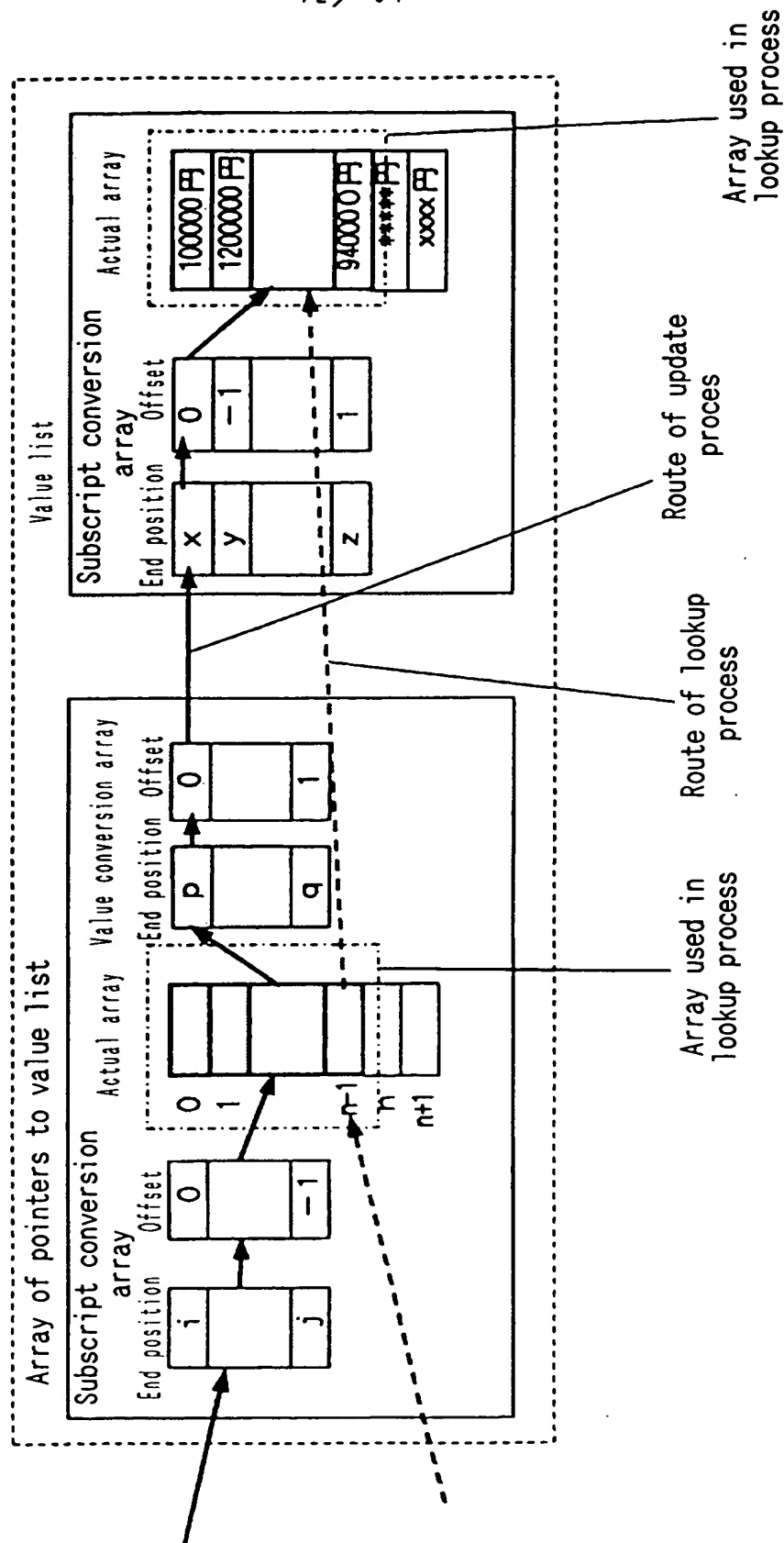
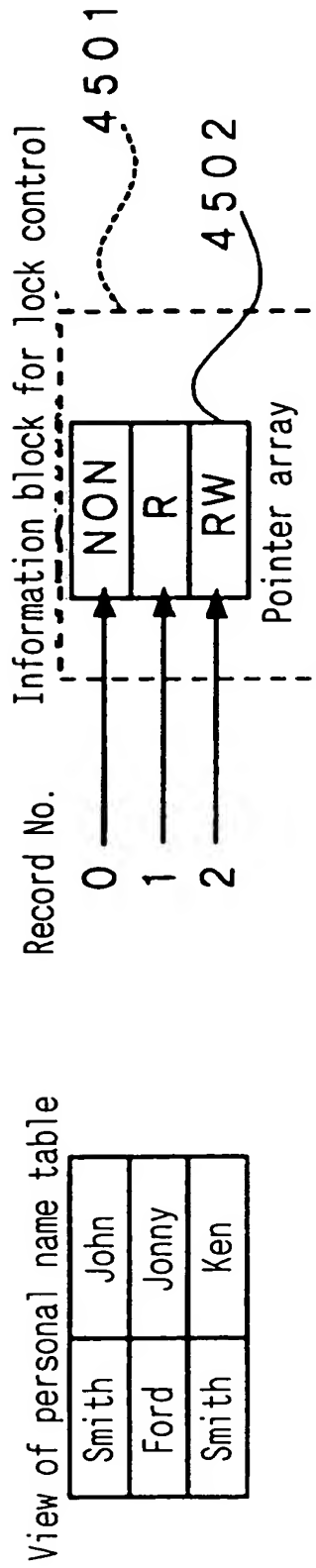


FIG. 45



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FIG. 46A

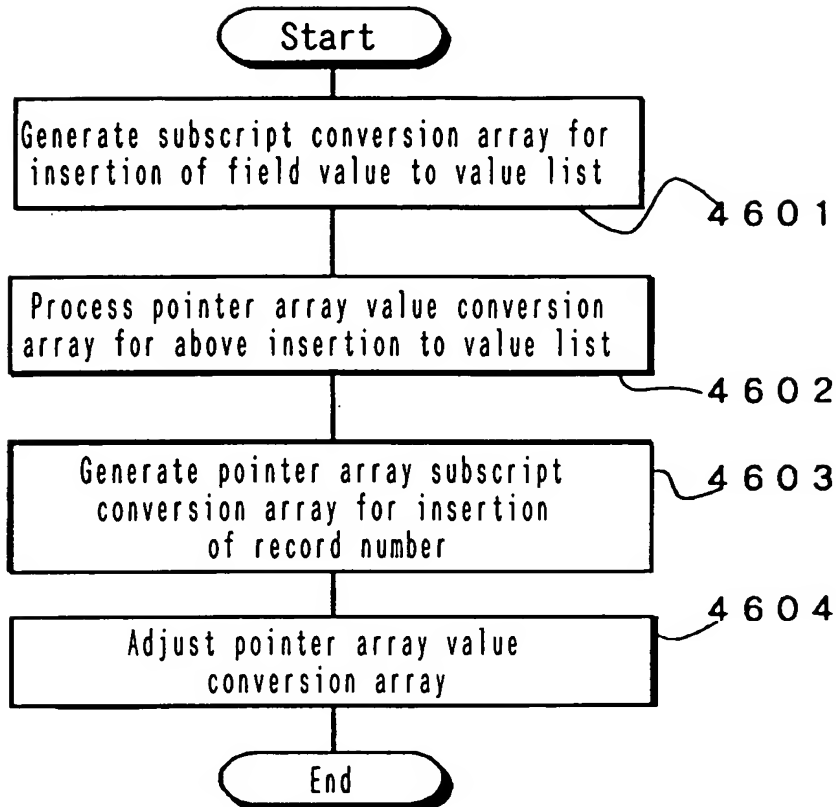
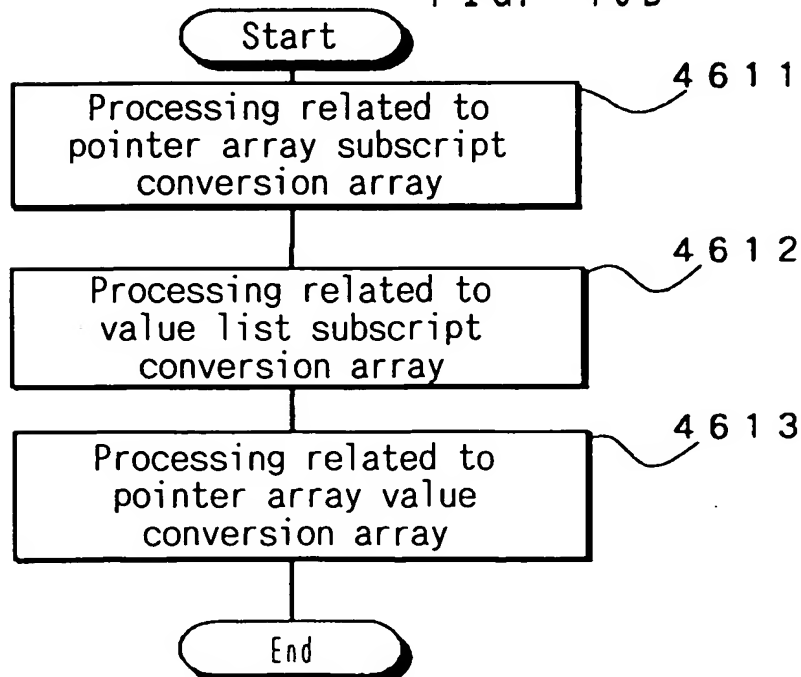


FIG. 46B

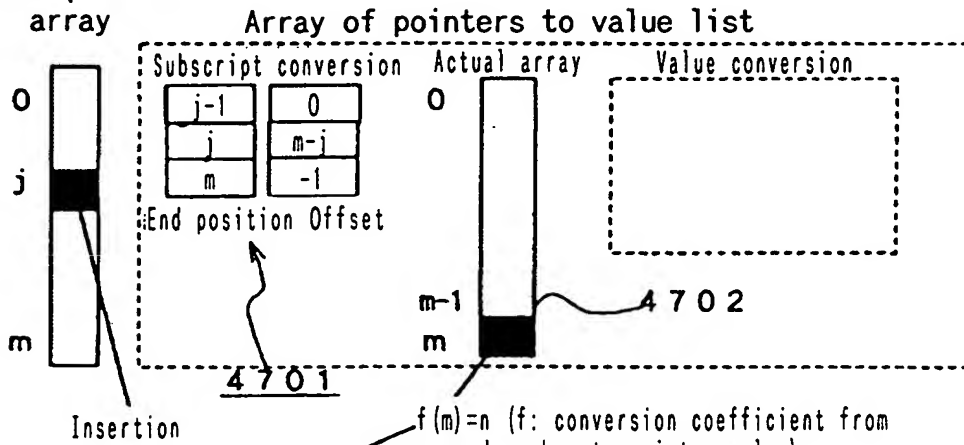


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FIG. 47

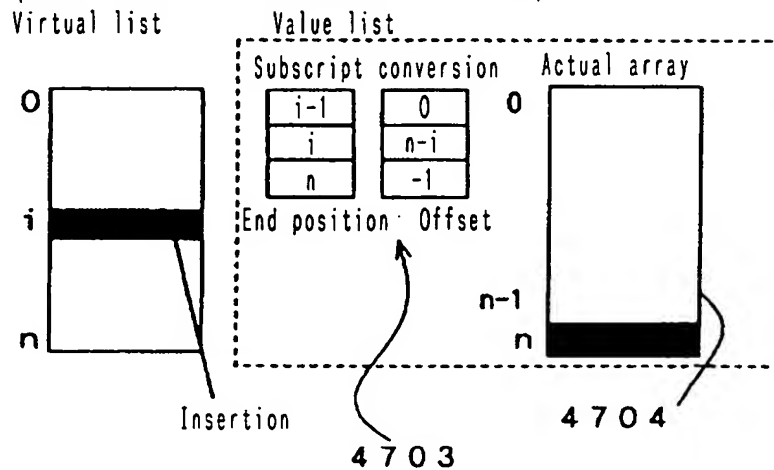
(Pointer array: from m records to m+1 records)

Virtual pointer



(Value list: from n records to n+1 records)

Virtual list

Value conversion array
of pointer array

i-1	0
n-i	+1
n	i-n

End position

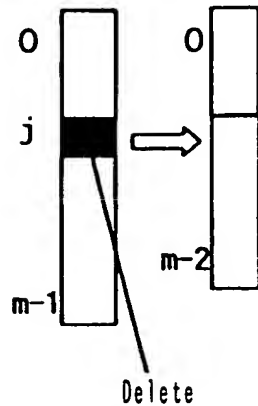
Offset

4 7 0 5

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FIG. 48

(Pointer array: from m records to m-1 records)

Virtual pointer
array

Array of pointers to value list

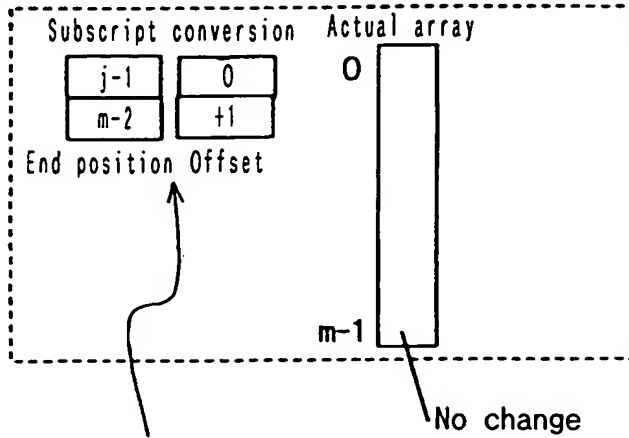
4 8 0 1

FIG. 49

Record No.

Set of structure arrays

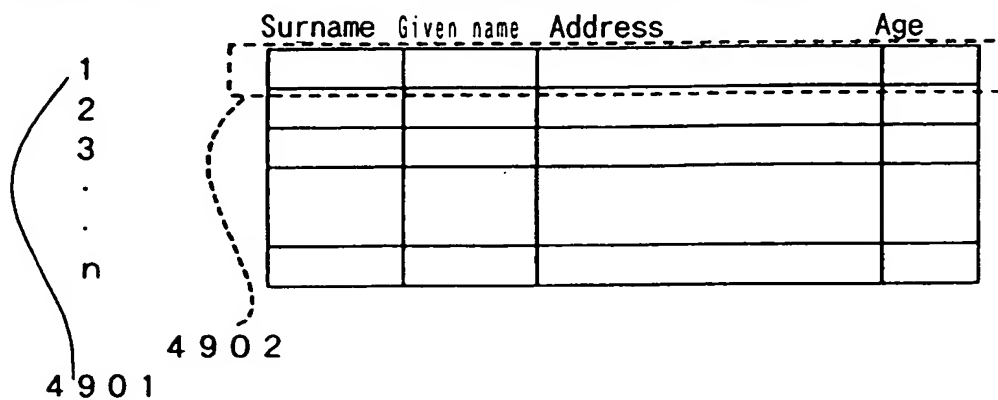


FIG. 50

Array containing totals (100 million records)

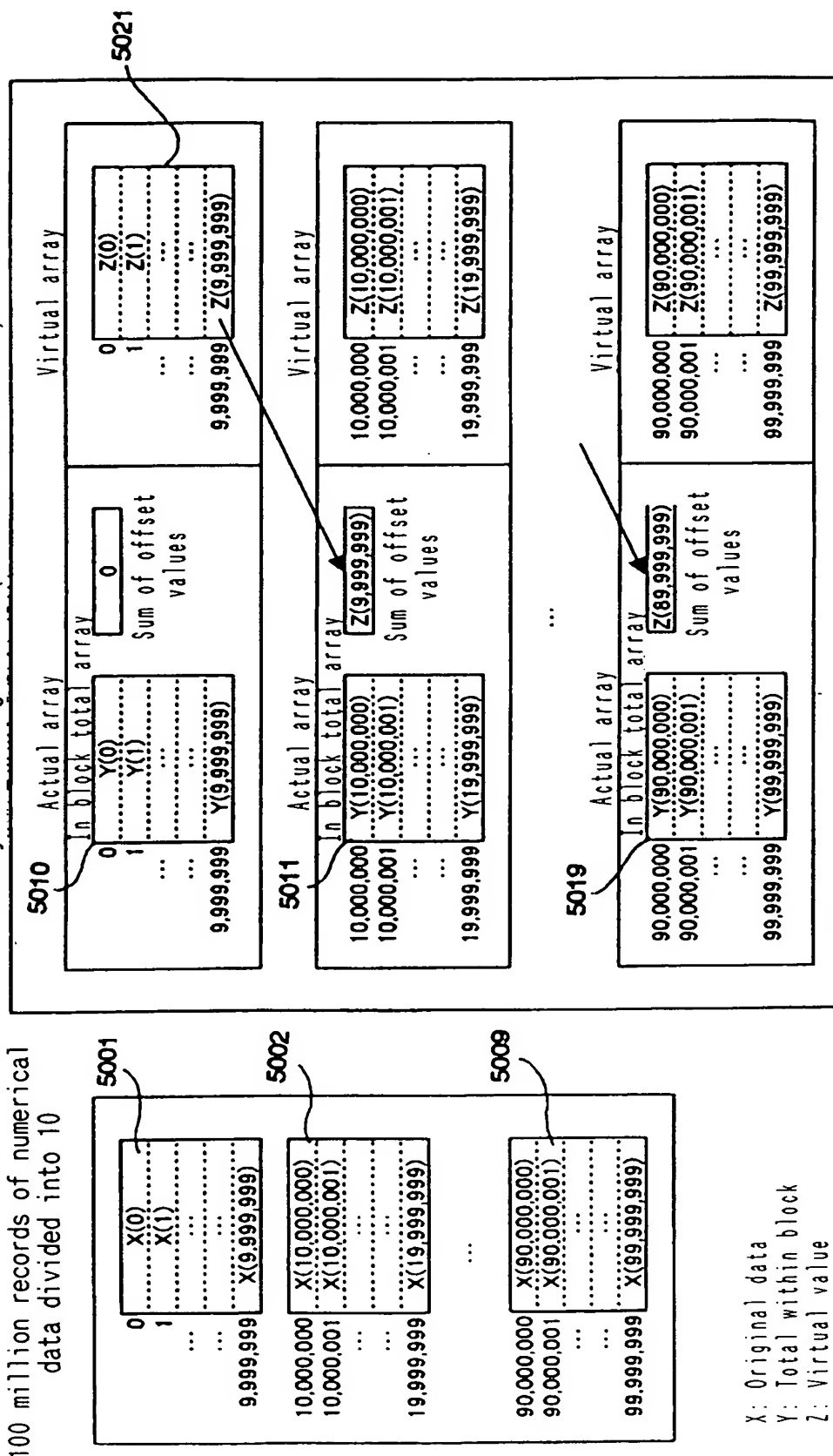
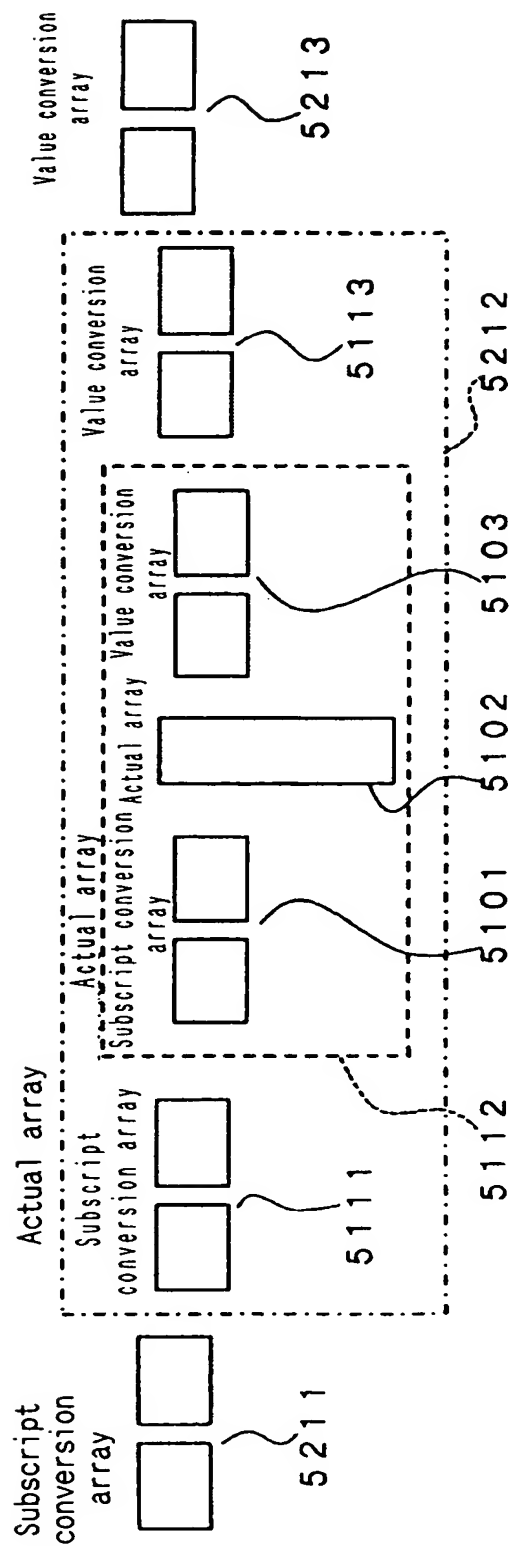


FIG. 51



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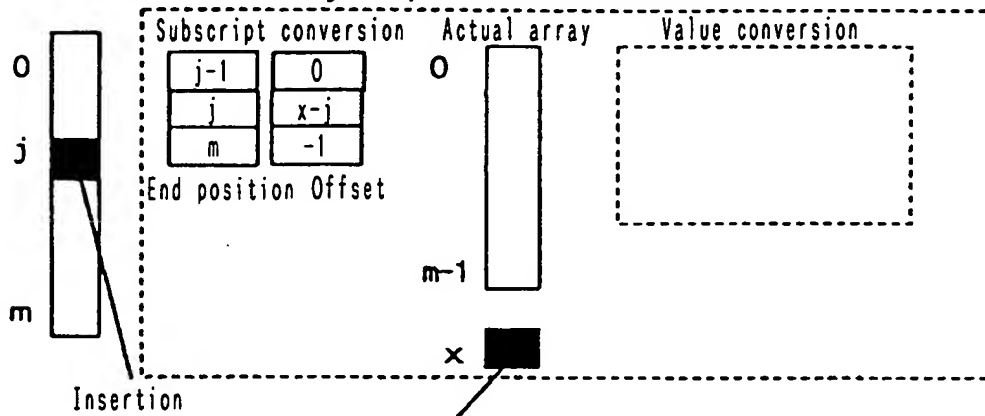
FIG. 52

(Pointer array: from m records to m+1 records)

Virtual pointer

array

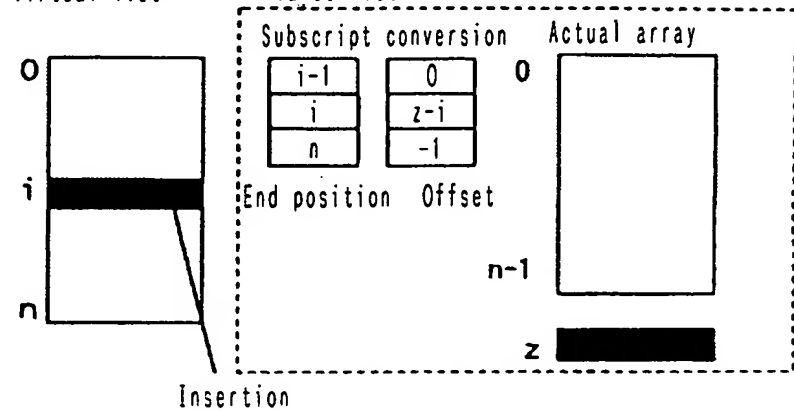
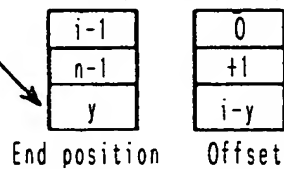
Array of pointers to value list

 $f(x)=y$

(Value list: from n records to n+1 records)

Virtual list

Value list

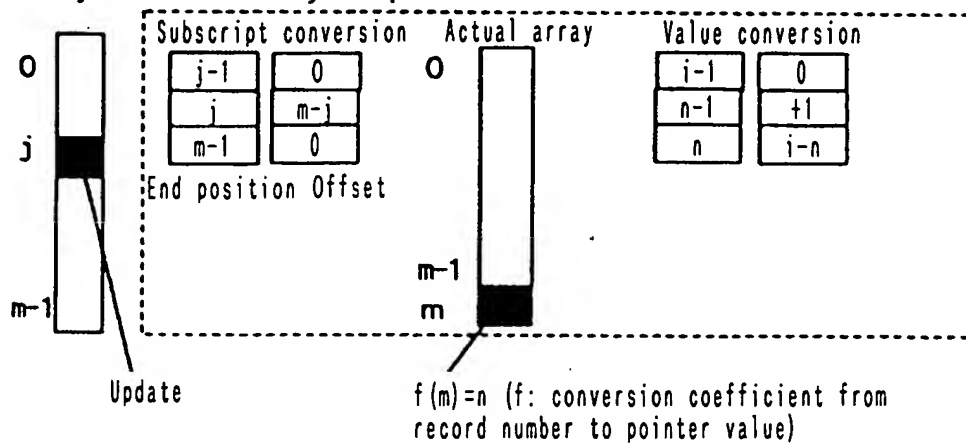
Value conversion array
of pointer array

10048231-012802

FIG. 53

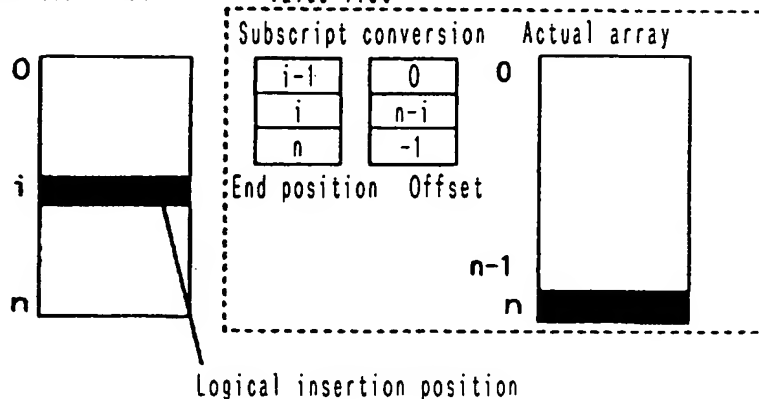
Virtual pointer
array

Array of pointers to value list



Virtual list

Value list

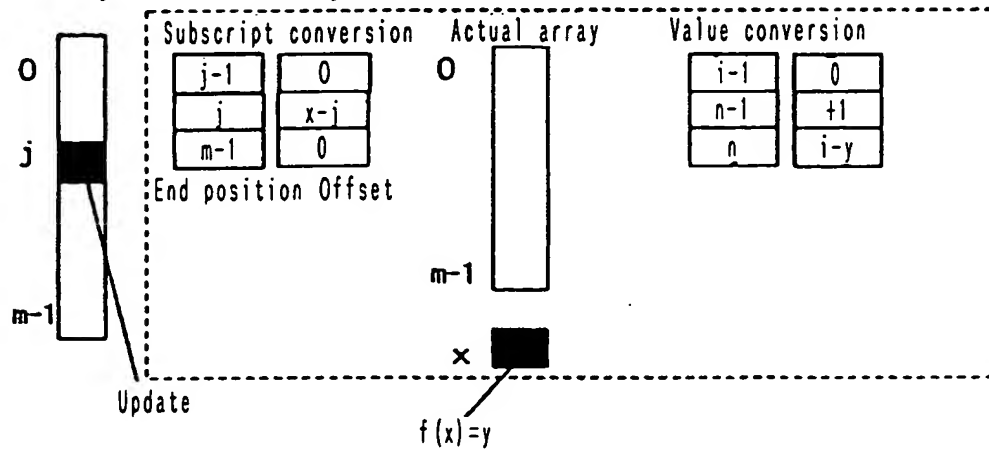


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FIG. 54

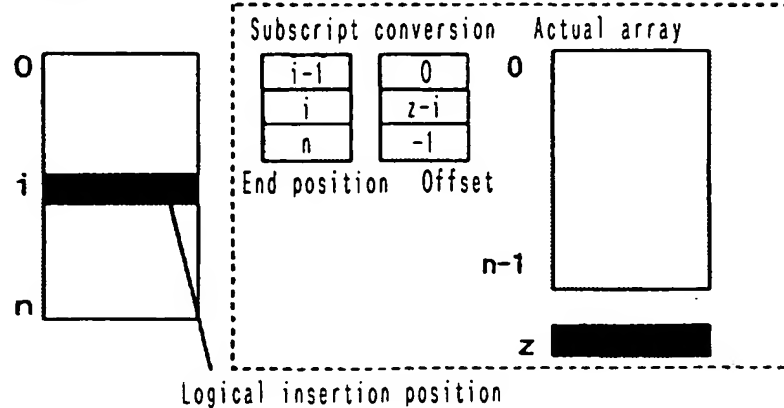
Virtual pointer
array

Array of pointers to value list



Virtual list

Value list



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